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Wu

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(54) **CABLE CONNECTOR ASSEMBLY WITH LATCHING MECHANISM**

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(73) Assignee: **Hon Hai Precision Ind. Co., Ltd.**, Taipei Hsien (TW)

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(51) **Int. Cl.**
H01R 9/03 (2006.01)

(52) **U.S. Cl.** **439/610**; 439/357; 439/484

(58) **Field of Classification Search** 439/610, 439/483, 484, 357
See application file for complete search history.

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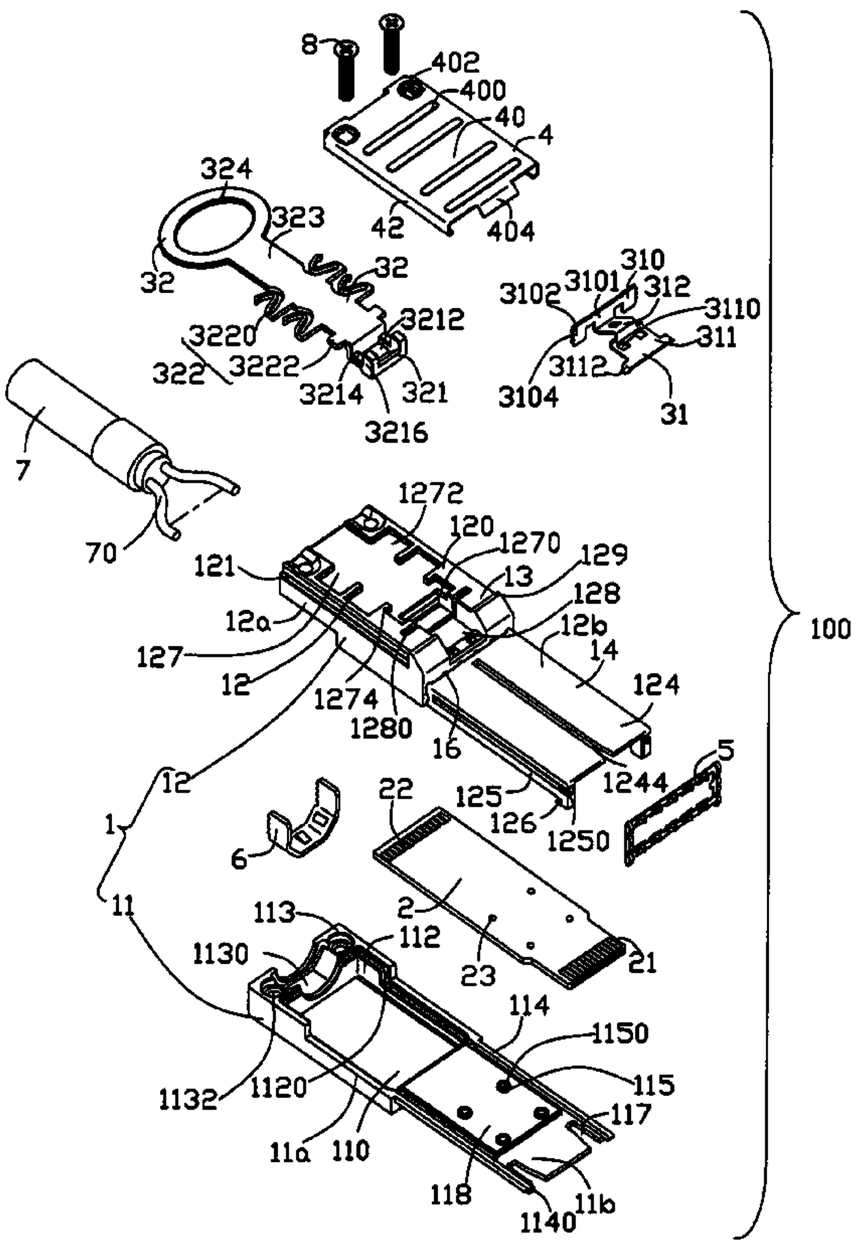
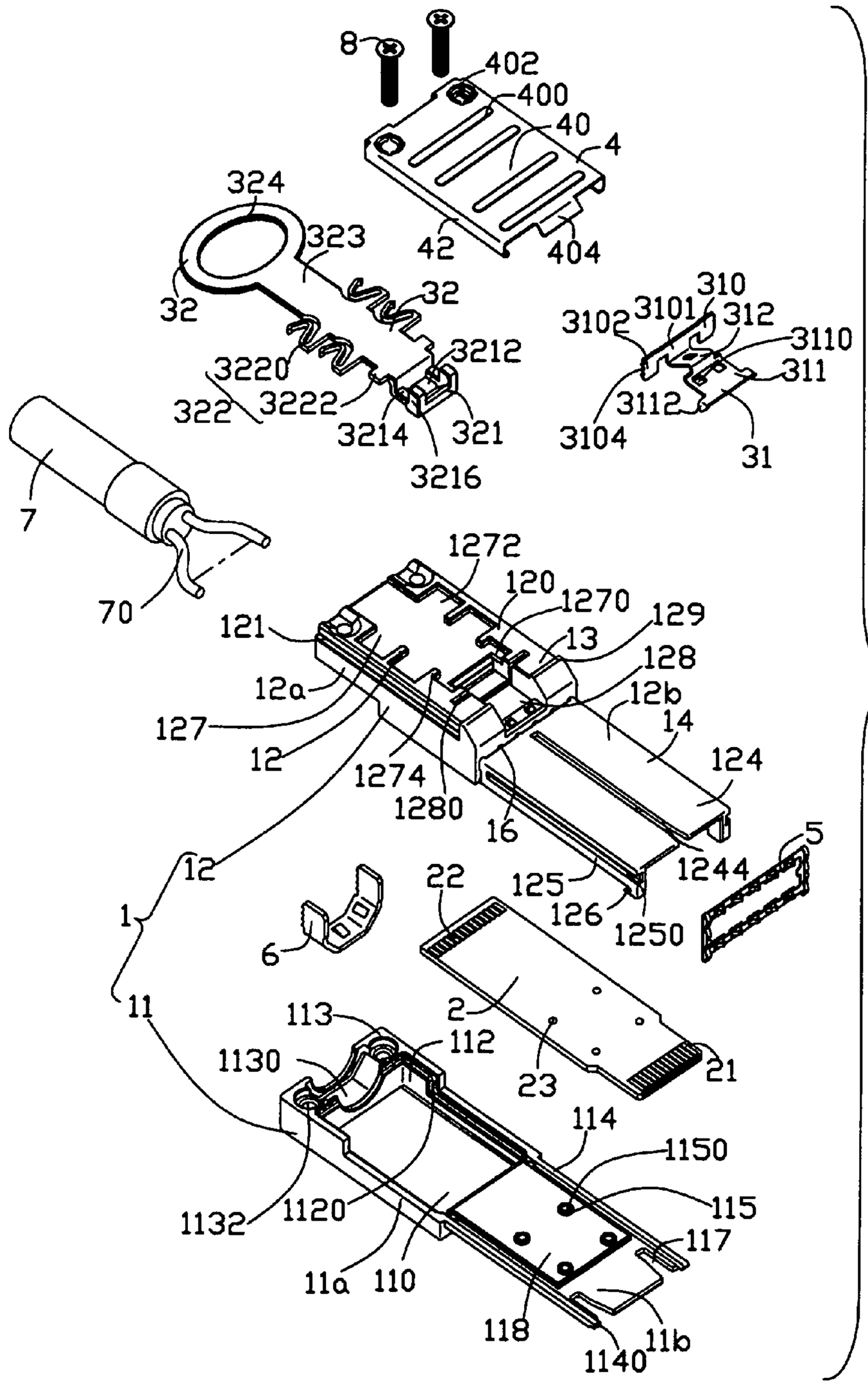
(74) *Attorney, Agent, or Firm*—Wei Te Chung

(57) **ABSTRACT**

A cable connector assembly (**100**) includes a metal housing (**1**), a printed circuit board (**2**) received in the housing, a cable (**7**) electrically connecting with the printed circuit board, and a latch member (**31**) assembled to the metal housing. The metal housing defines a top surface and a front surface perpendicular to the top surface. The latch member is assembled to the top surface of the metal housing for latching with a complementary connector and includes an engaging portion (**310**) substantially vertically planted into the top surface of the housing and a latch portion (**311**) extending forwardly from the engaging portion and beyond the front surface of the metal housing.

5 Claims, 24 Drawing Sheets

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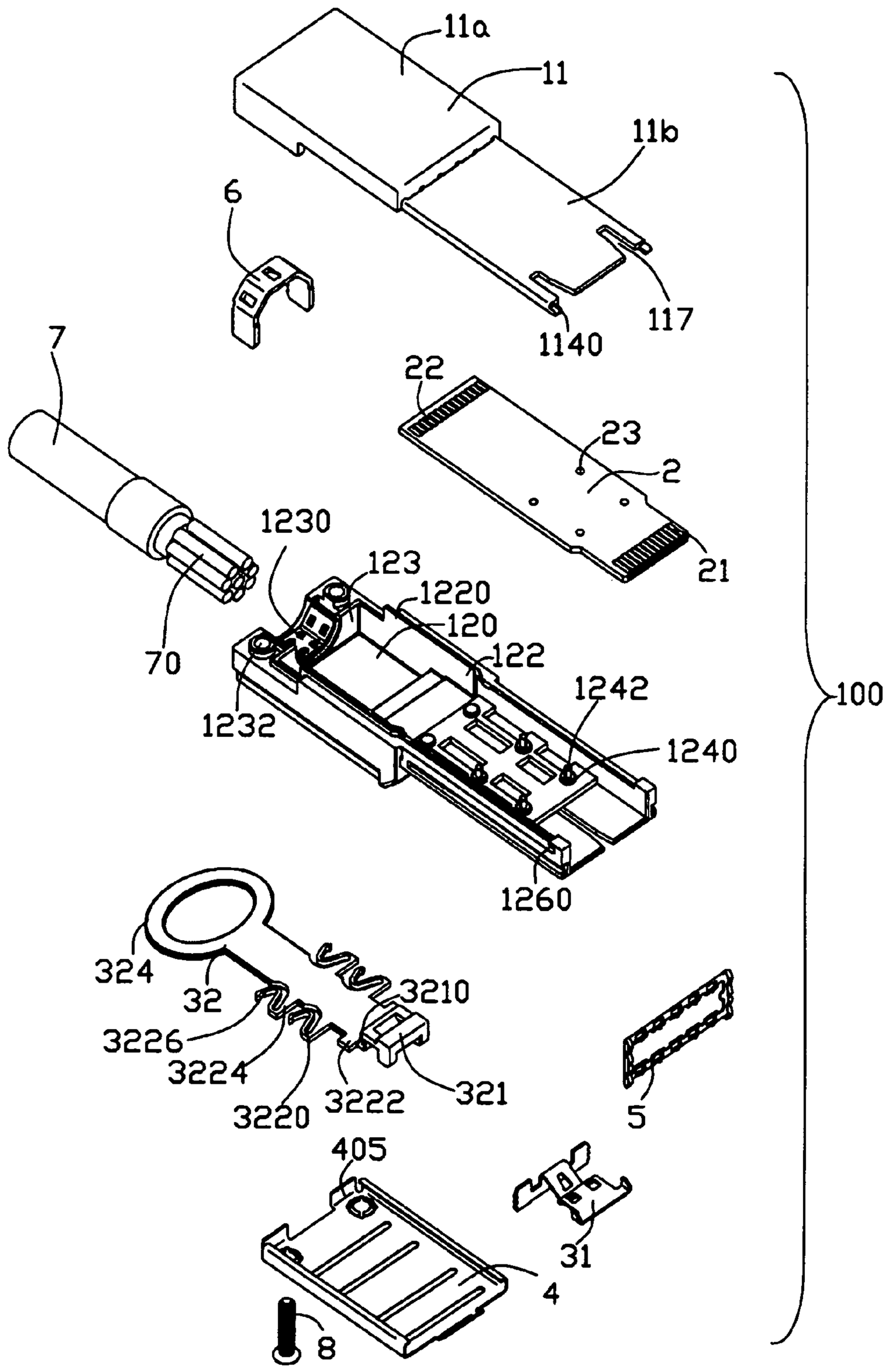
3101
312
3110
311
3112
3104
31
7
70
1272
120
1270
129
121
13
128
12a
12b
127
14
12
124
1274
1280
16
5
12
1244
125
22
126
1250
1
6
11
113
2
112
1130
23
21
114
1150
115
1132
1120
117
11a
110
118
11b
1140
100

FIG. 1


11a
11
11b
6
117
1140
7
22
23
2
21
1230
123
1220
120
122
1242
70
1232
1240
1260
100
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32
3210
3226
3224
3220
3222
321
5
405
31
4
8

FIG. 2

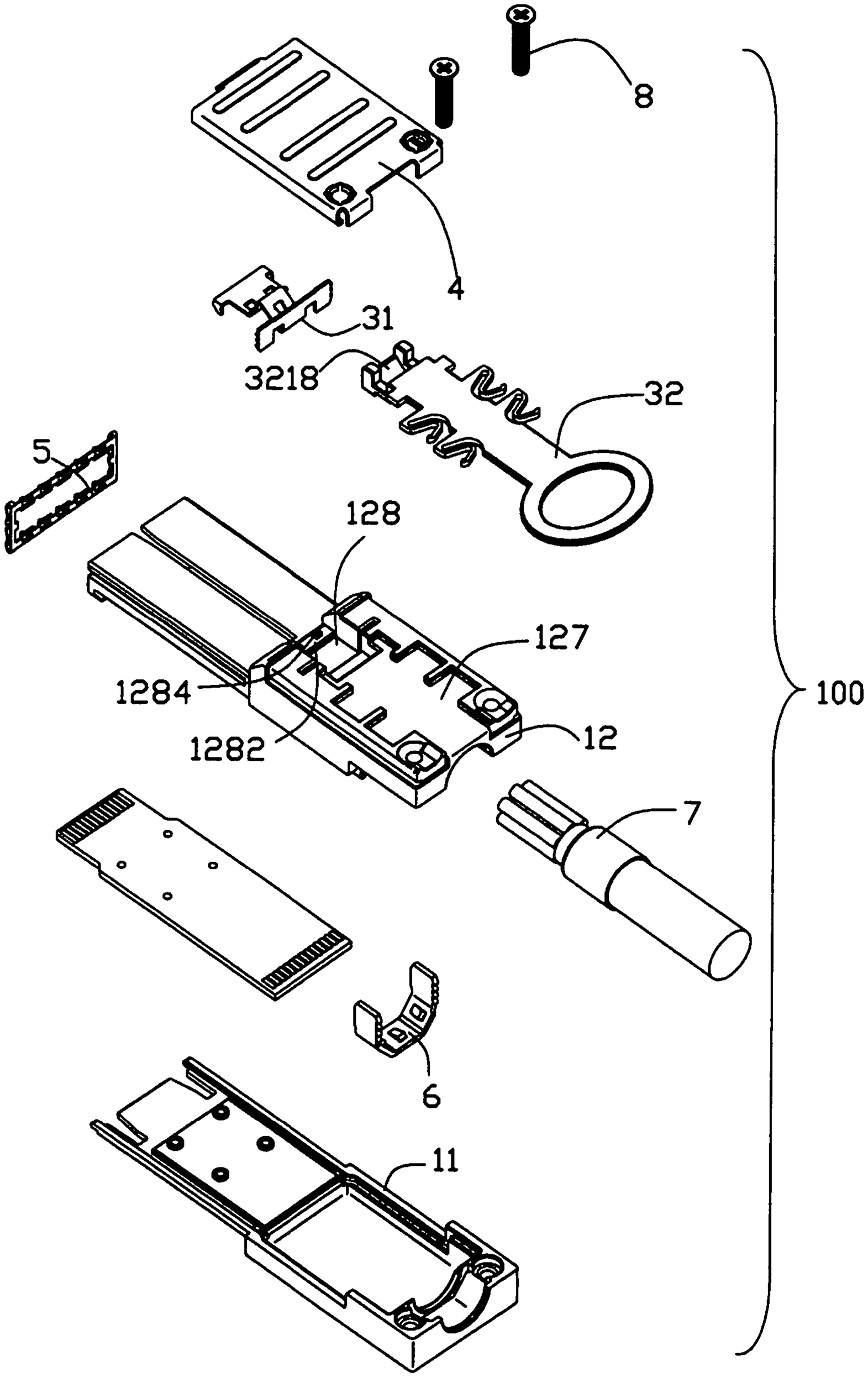


FIG. 3

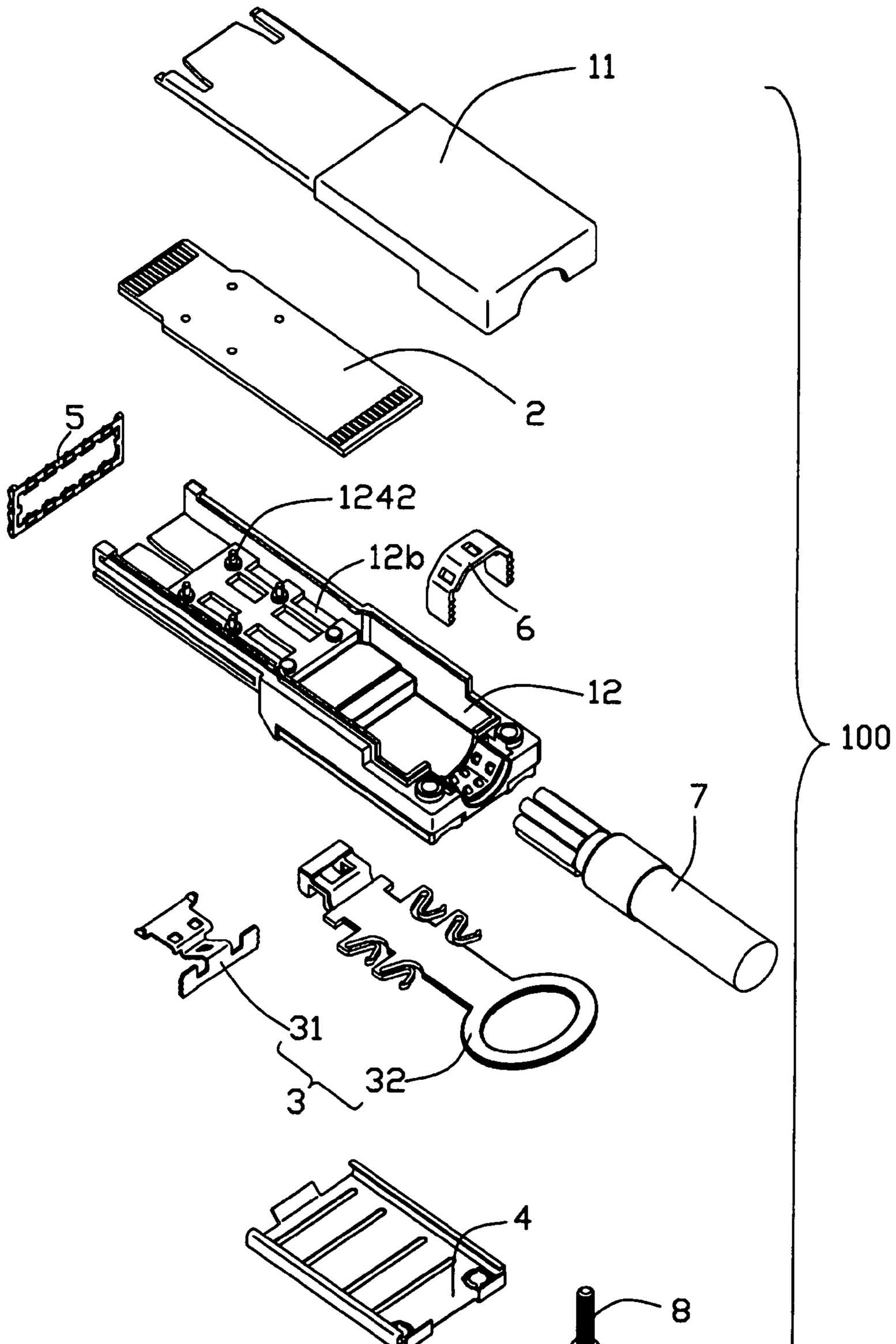


FIG. 4

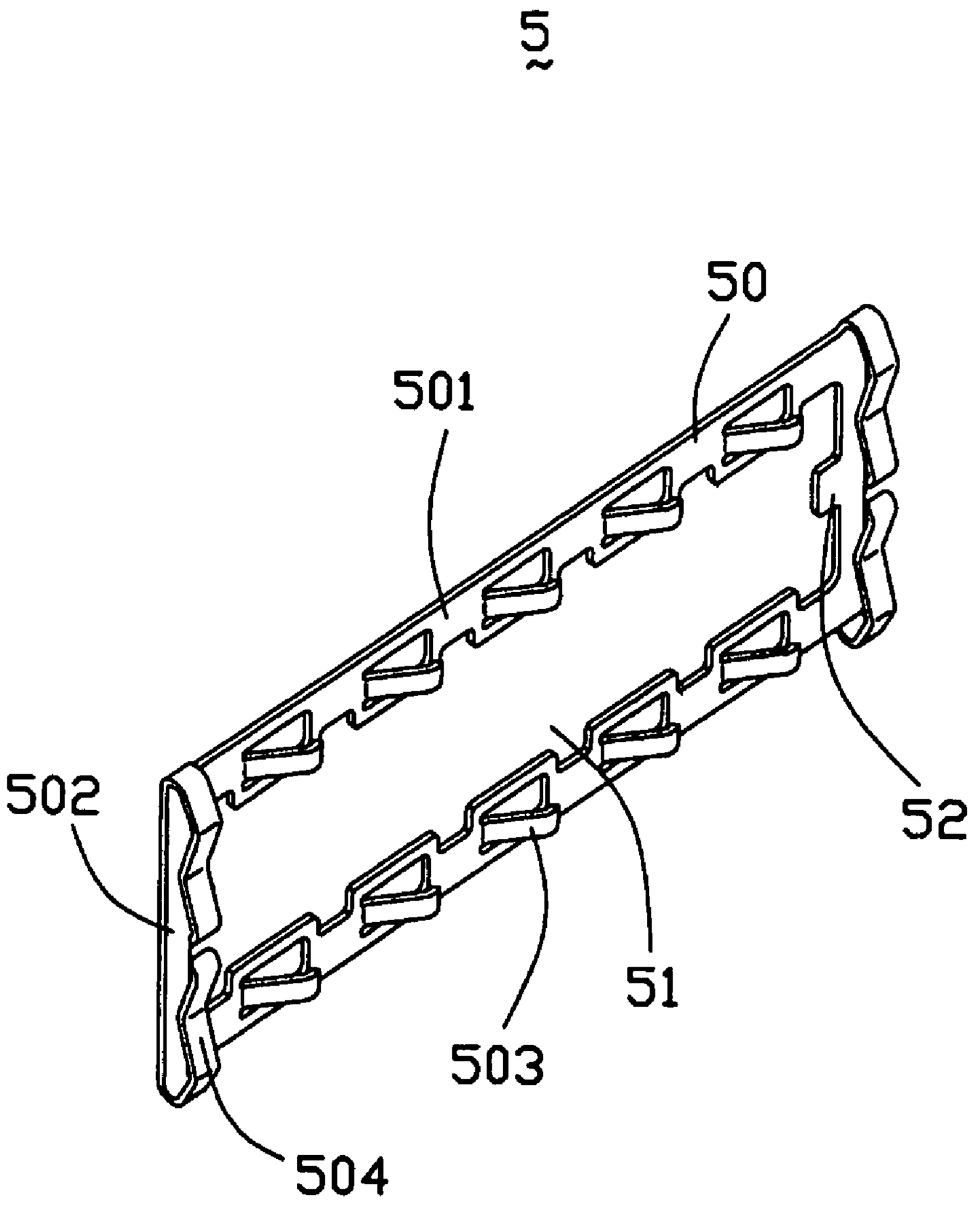
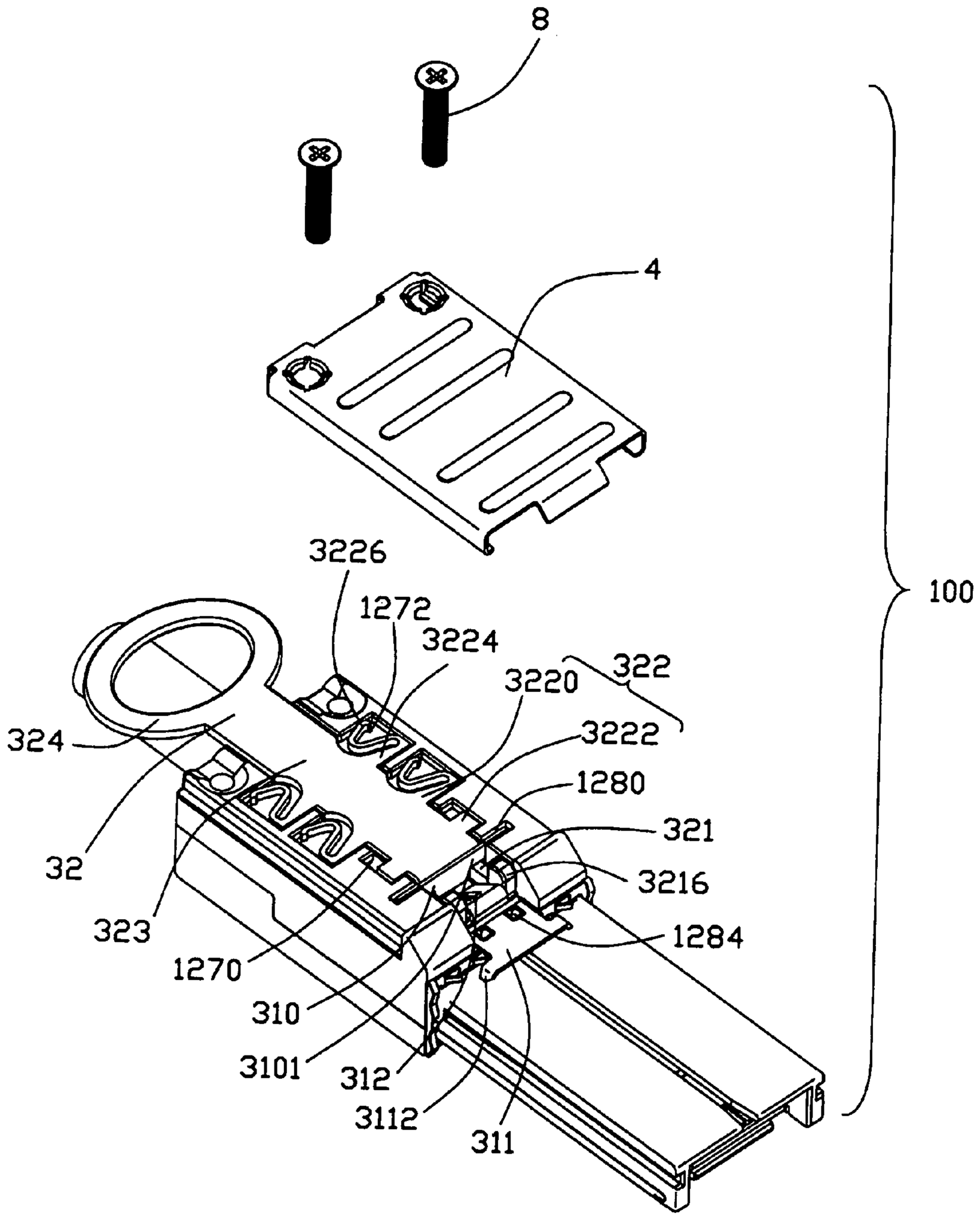


FIG. 5


8
4
3226
1272
3224
3220
322
324
3222
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321
32
3216
323
1284
1270
310
3101
312
3112
311
100

FIG. 6

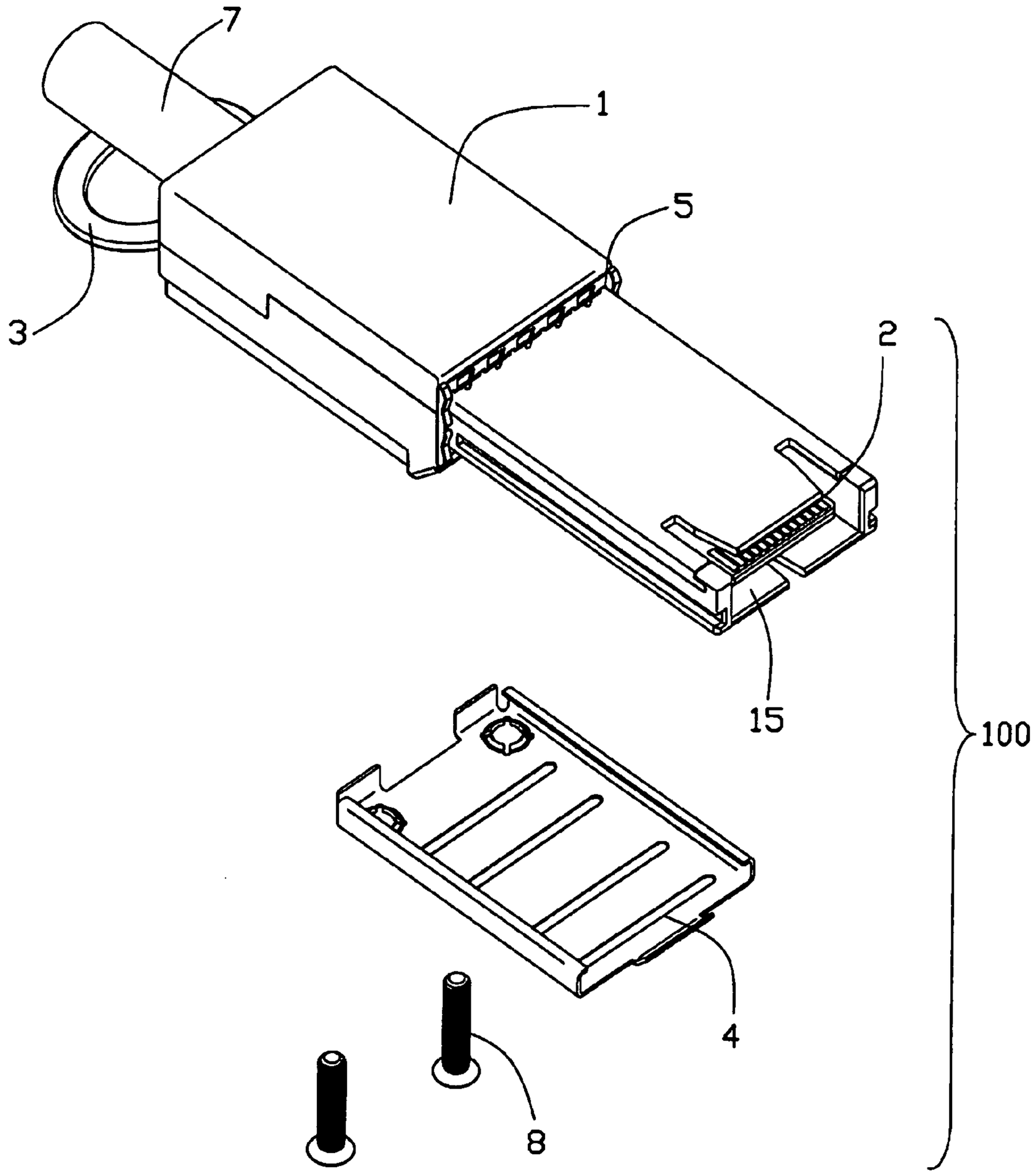


FIG. 7

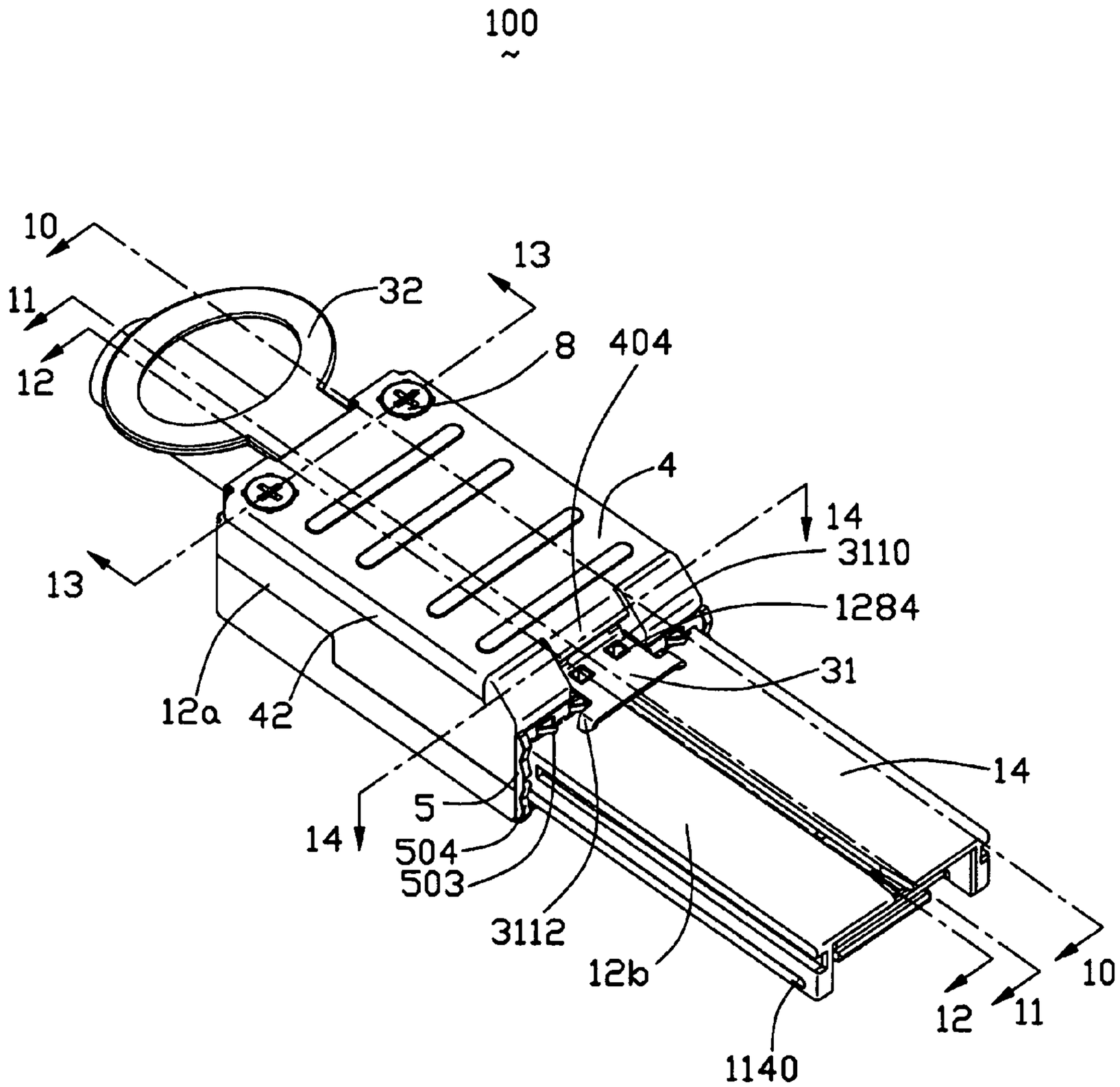

100
10
11
12
13
32
8
404
4
14
3110
1284
31
13
12a
42
14
5
504
503
3112
12b
14
10
12
11
1140

FIG. 8

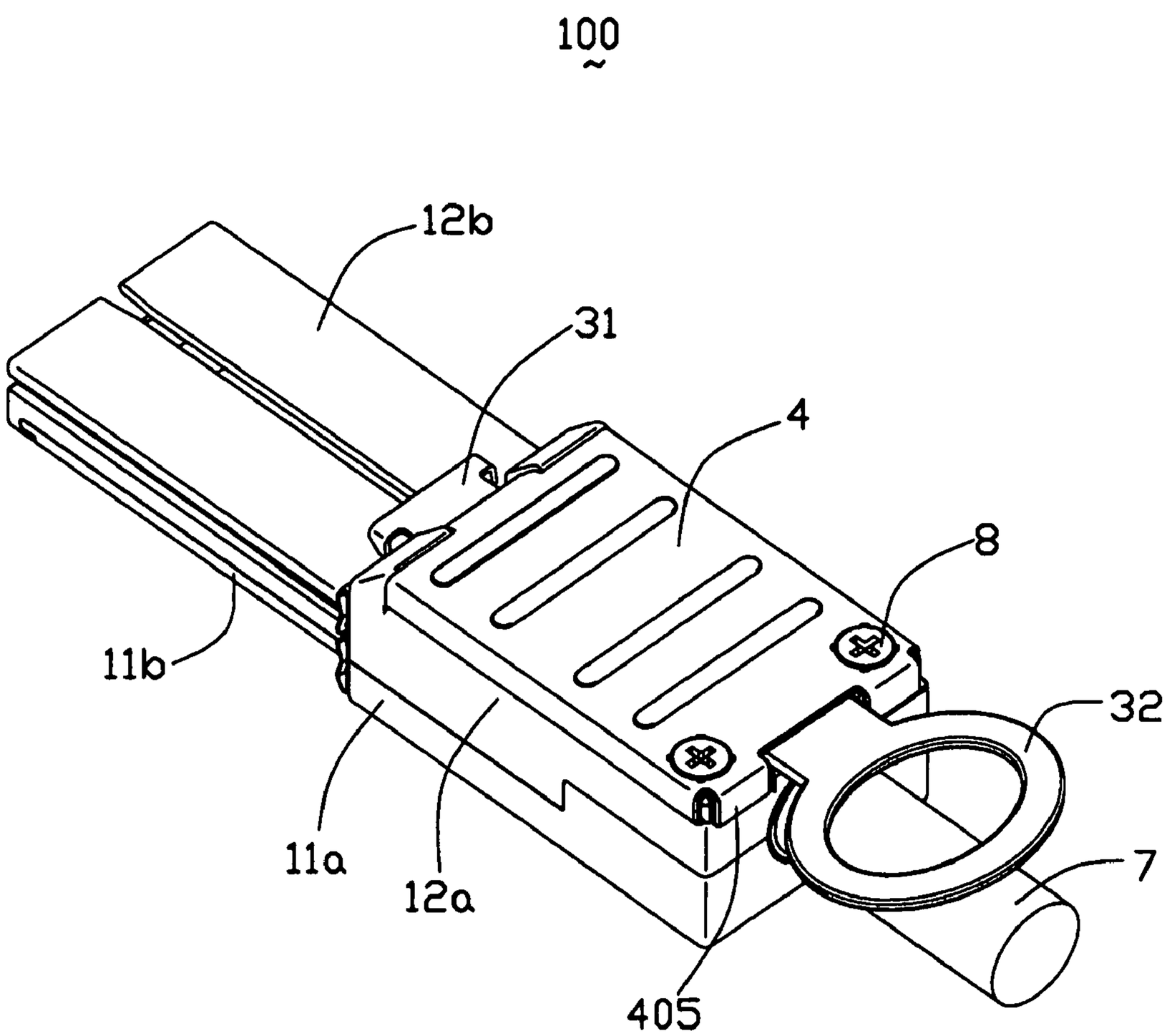
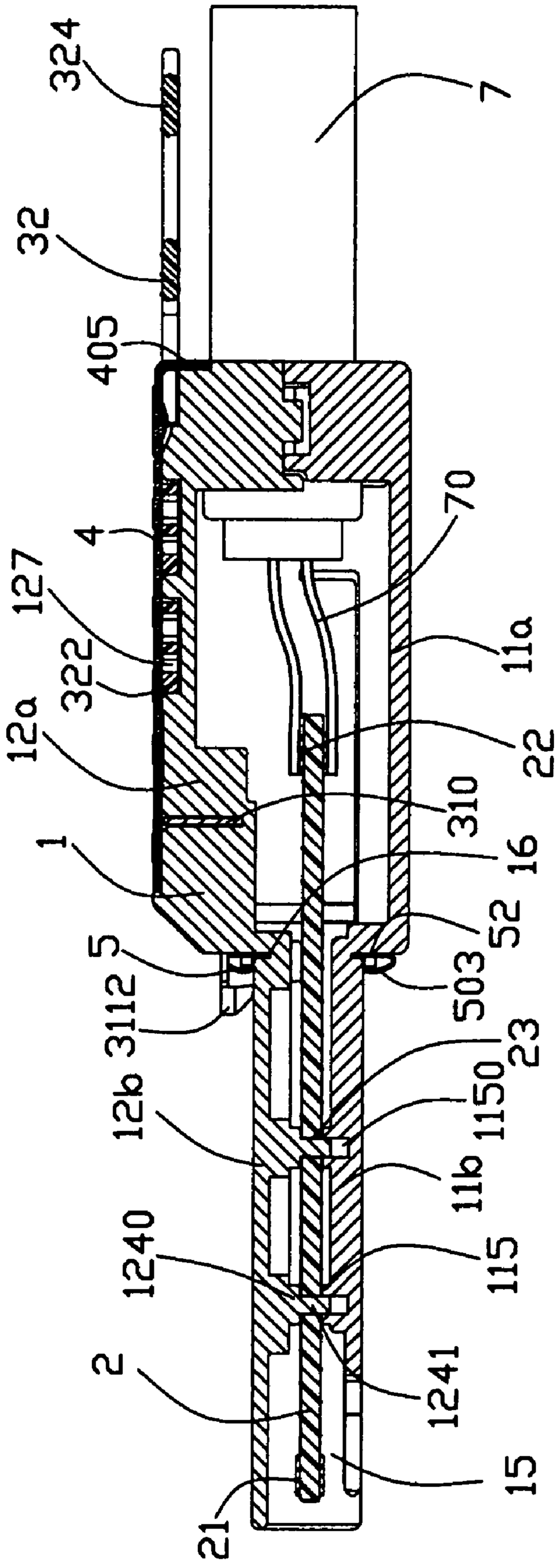


FIG. 9


324
7
32
405
70
4
127
322
11a
12a
22
310
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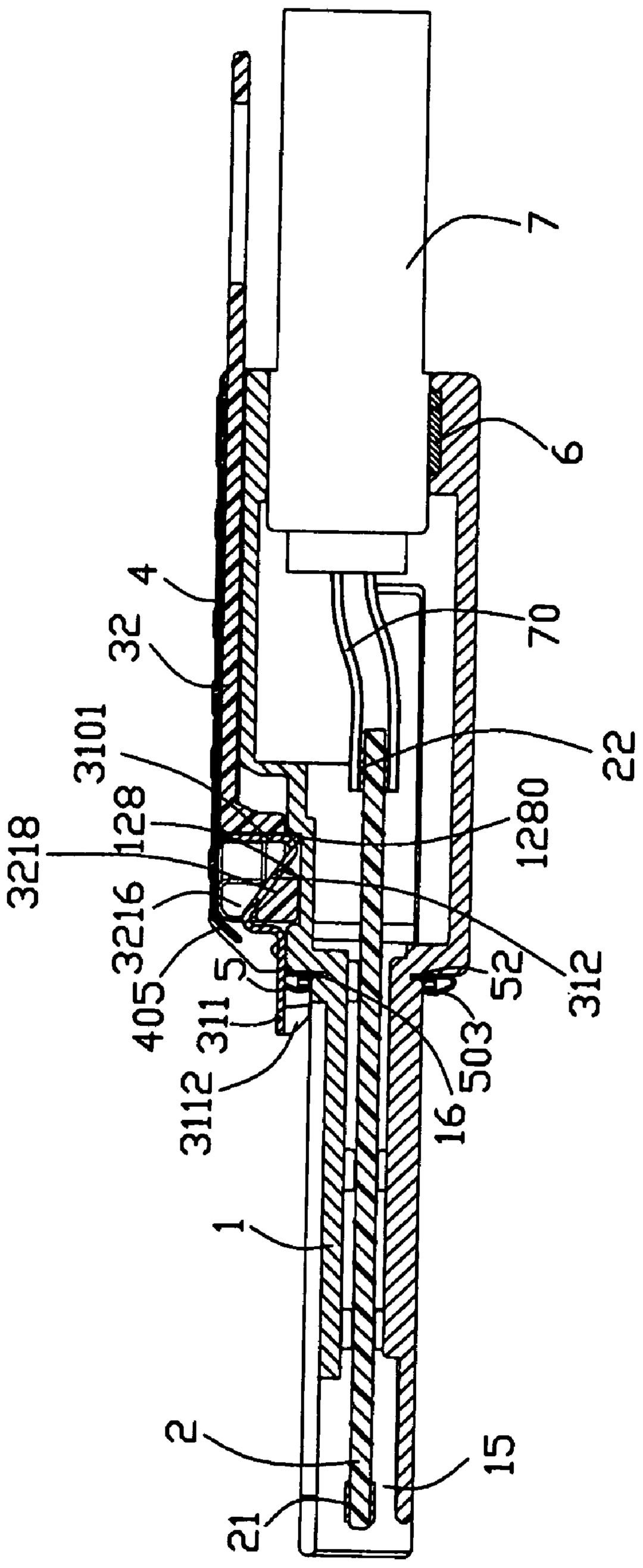
3112
23
12b
1150
11b
1240
115
1241
2
15
21

FIG. 10


6
4
32
70
3101
22
3218
128
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312
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5
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311
503
12
3112
16
1
2
15
21

FIG. 11

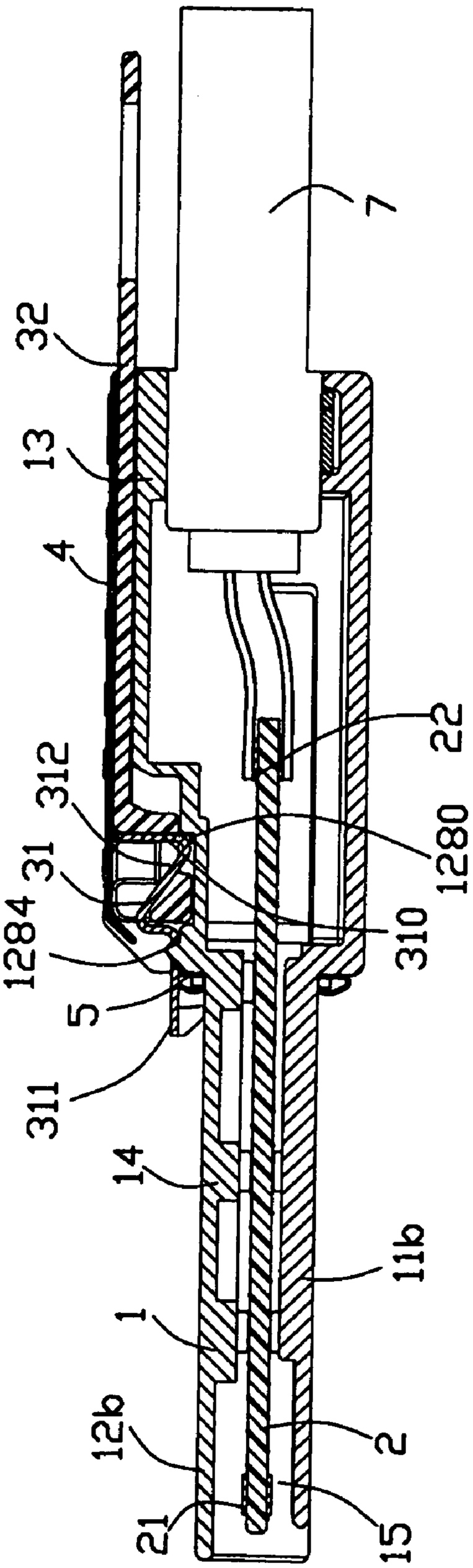


FIG. 12

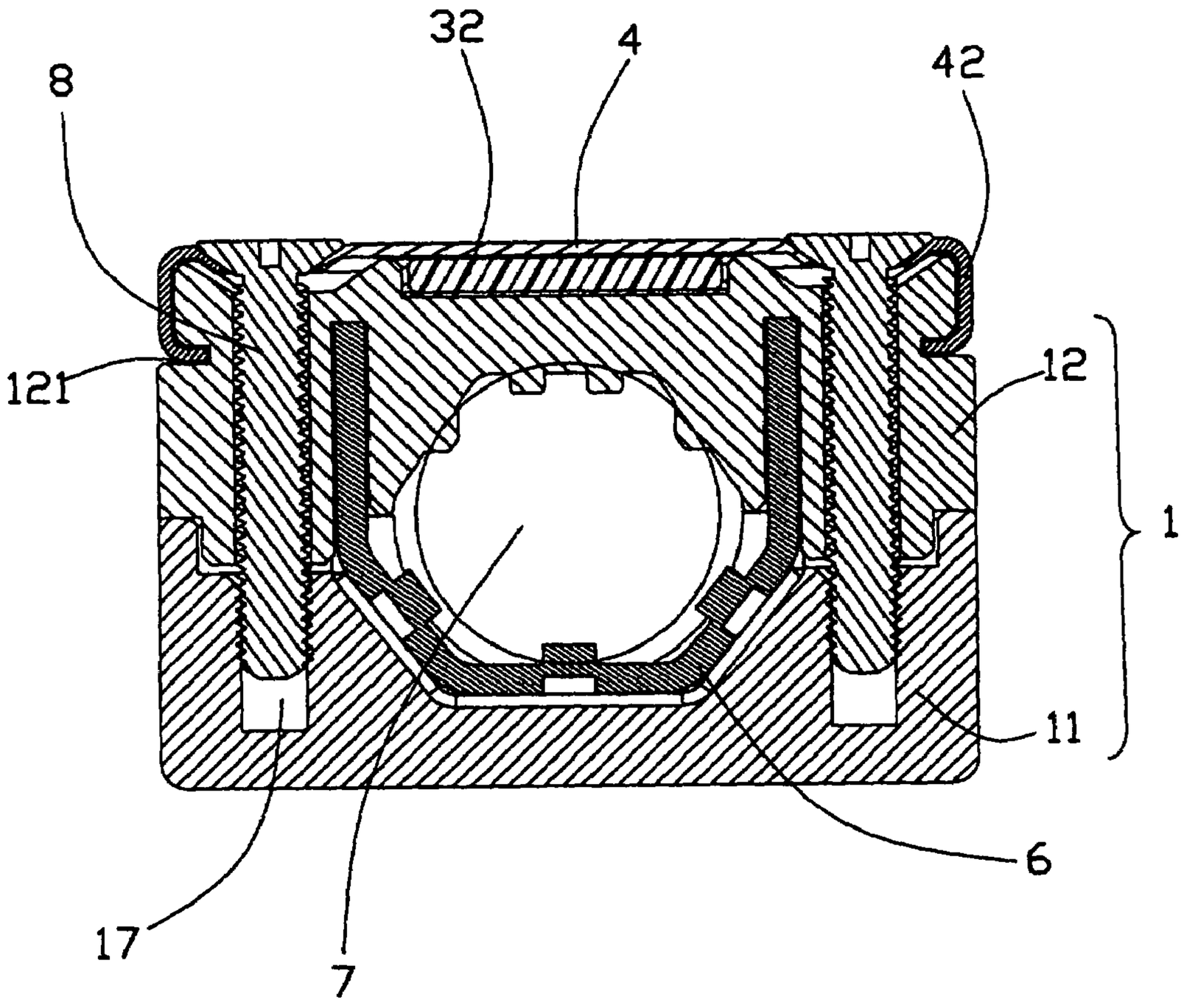
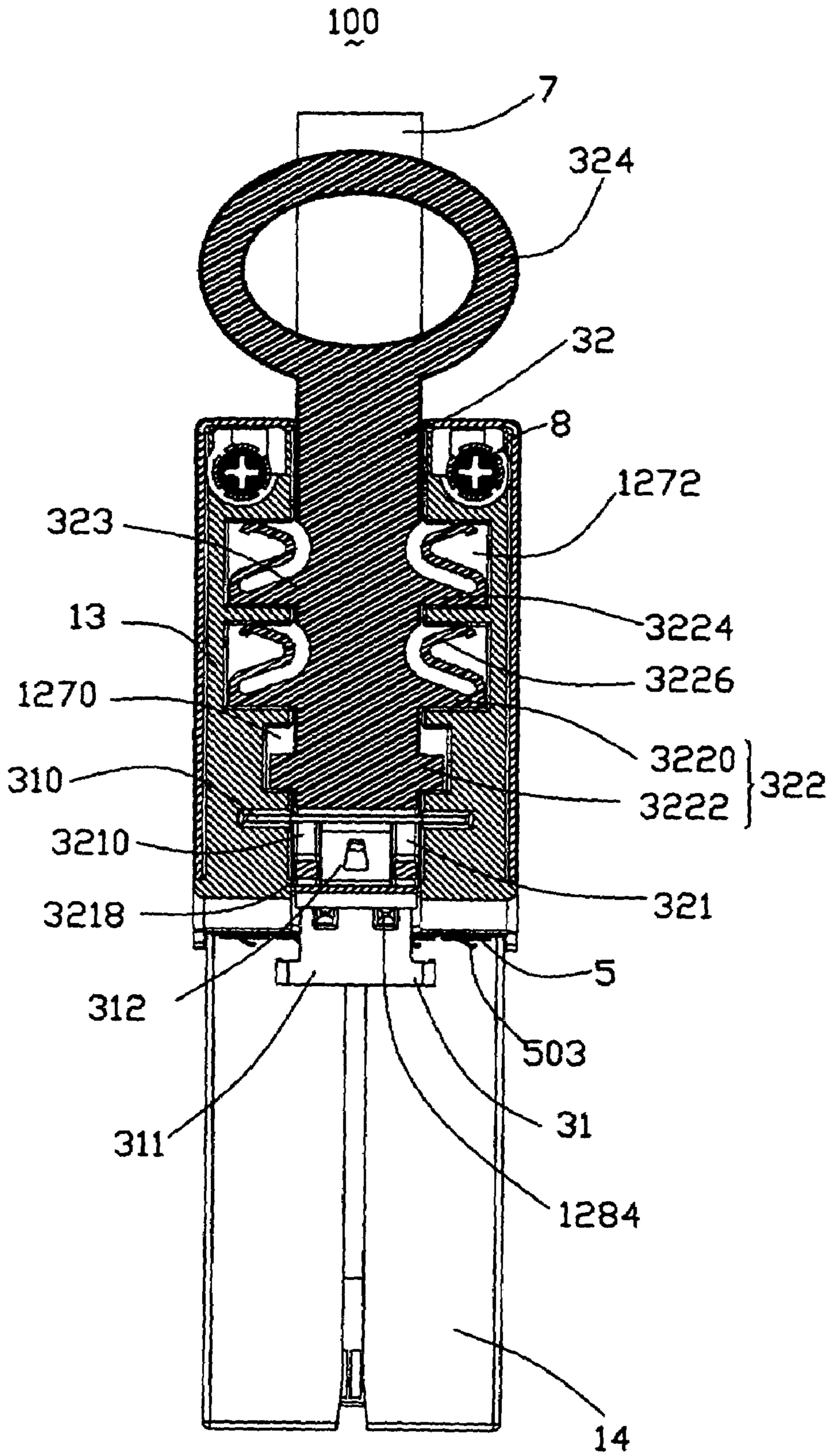


FIG. 13


100
7
324
32
8
1272
323
13
3224
1270
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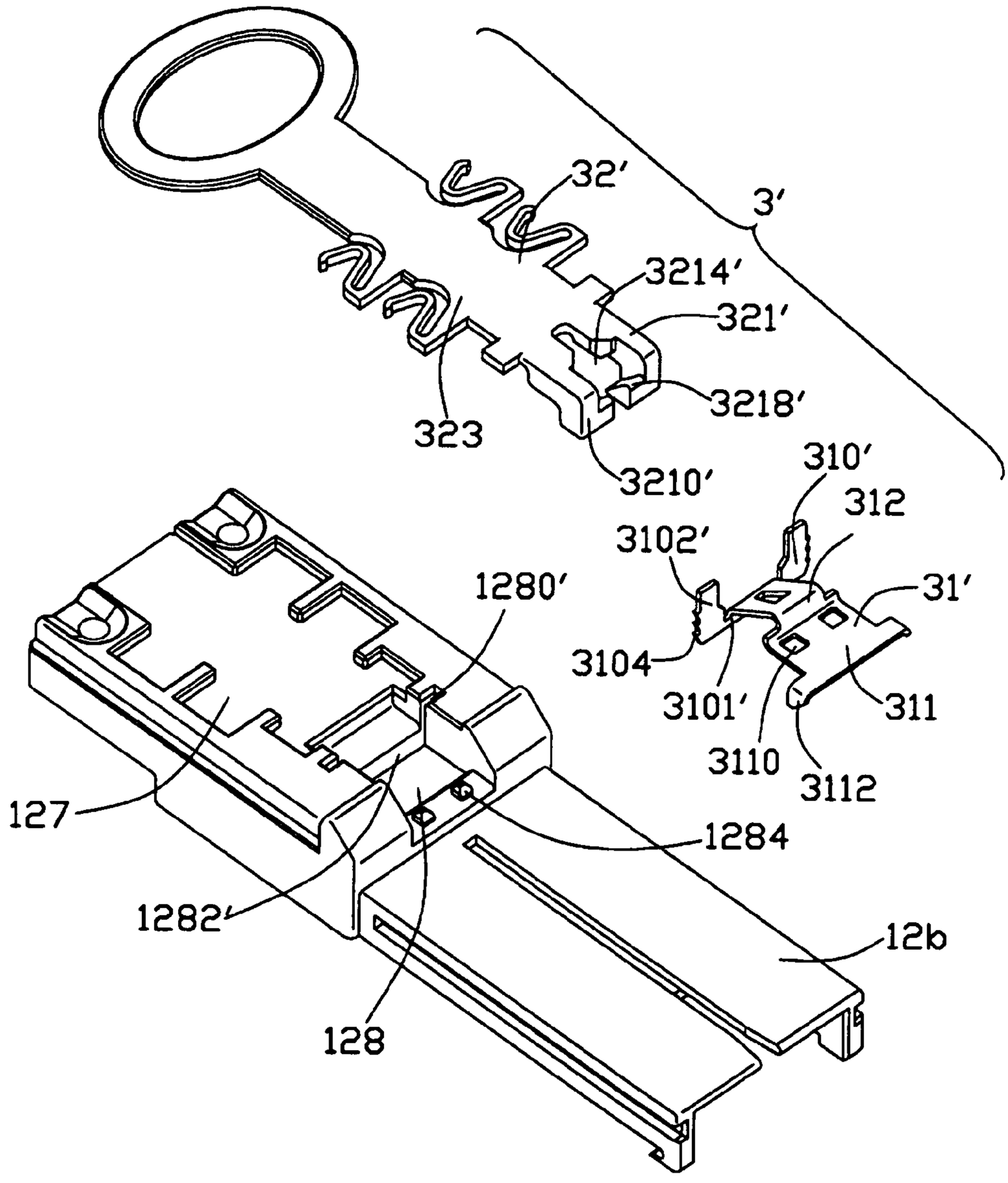
321
3218
5
312
503
31
311
1284
14

FIG. 14


32'
3'
3214'
321'
3218'
323
3210'
310'
312
3102'
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31'
3104
3101'
311
3110
3112
127
1284
1282
12b
128

FIG. 15

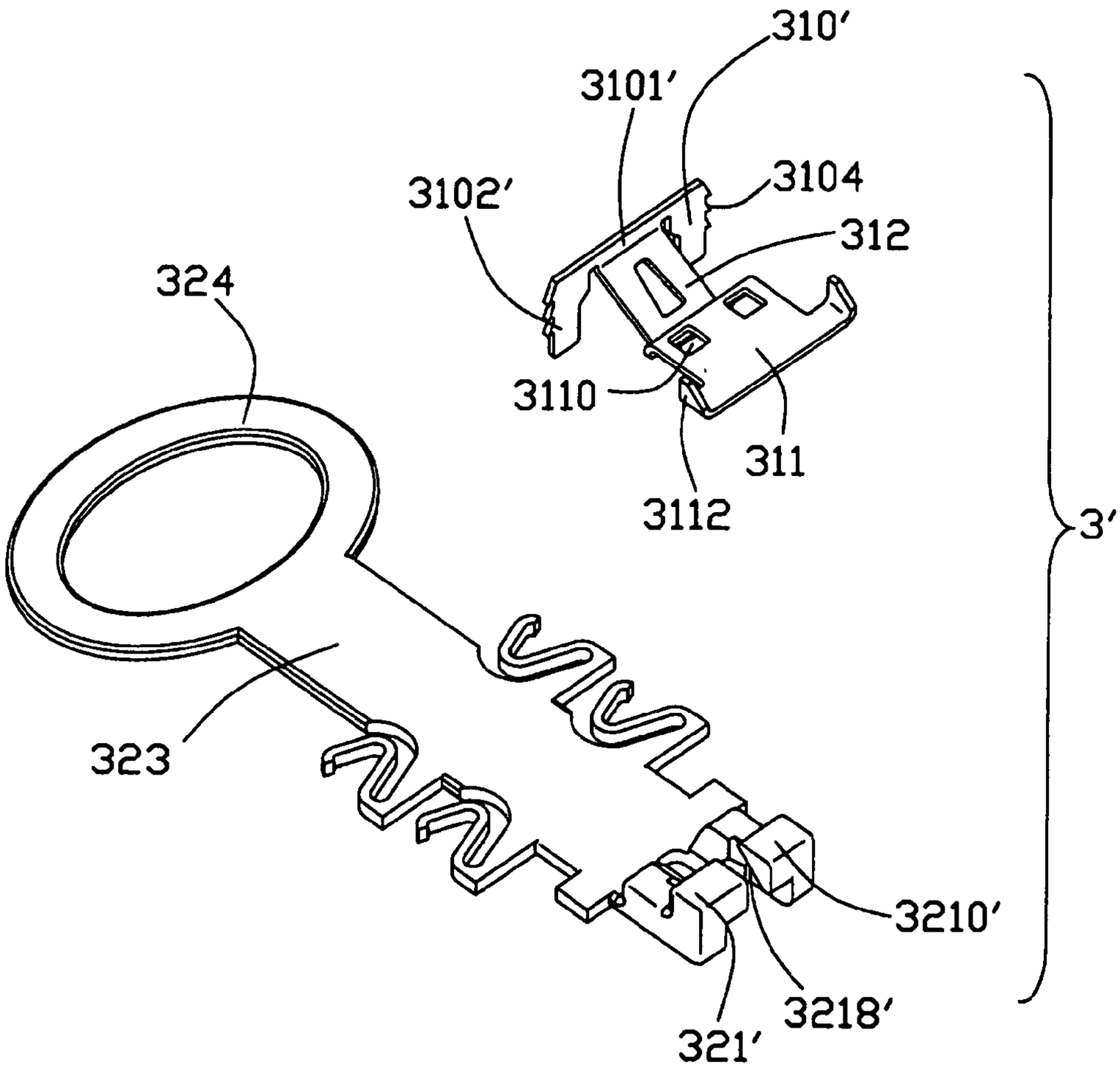


FIG. 16

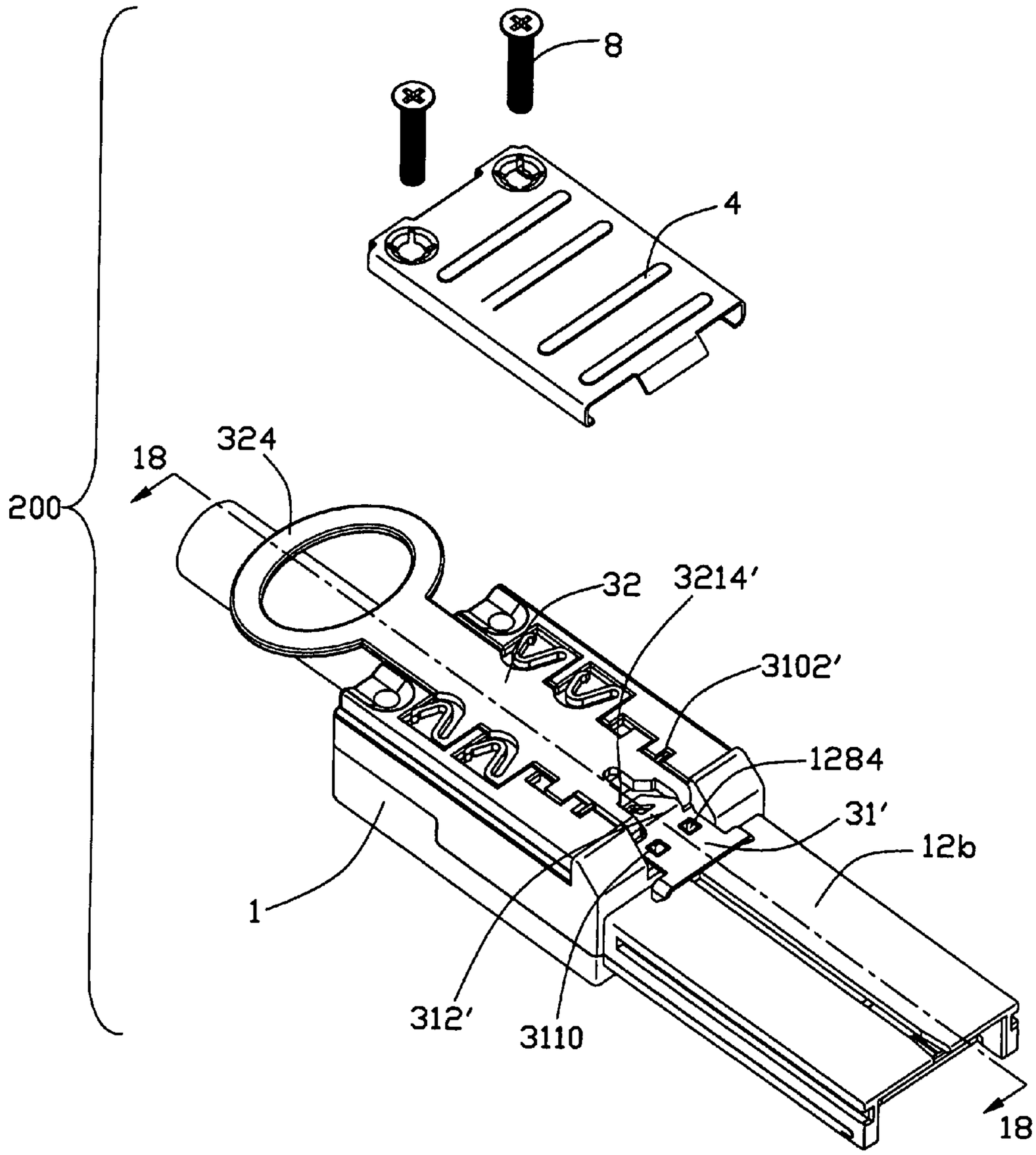


FIG. 17

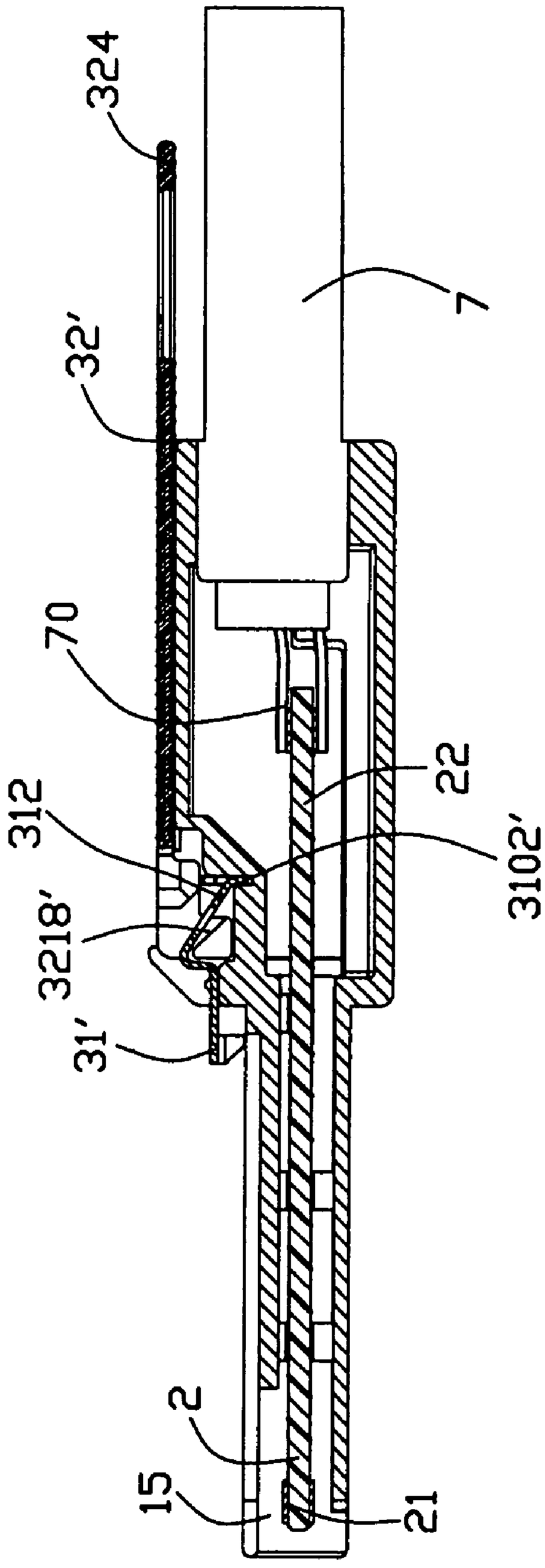
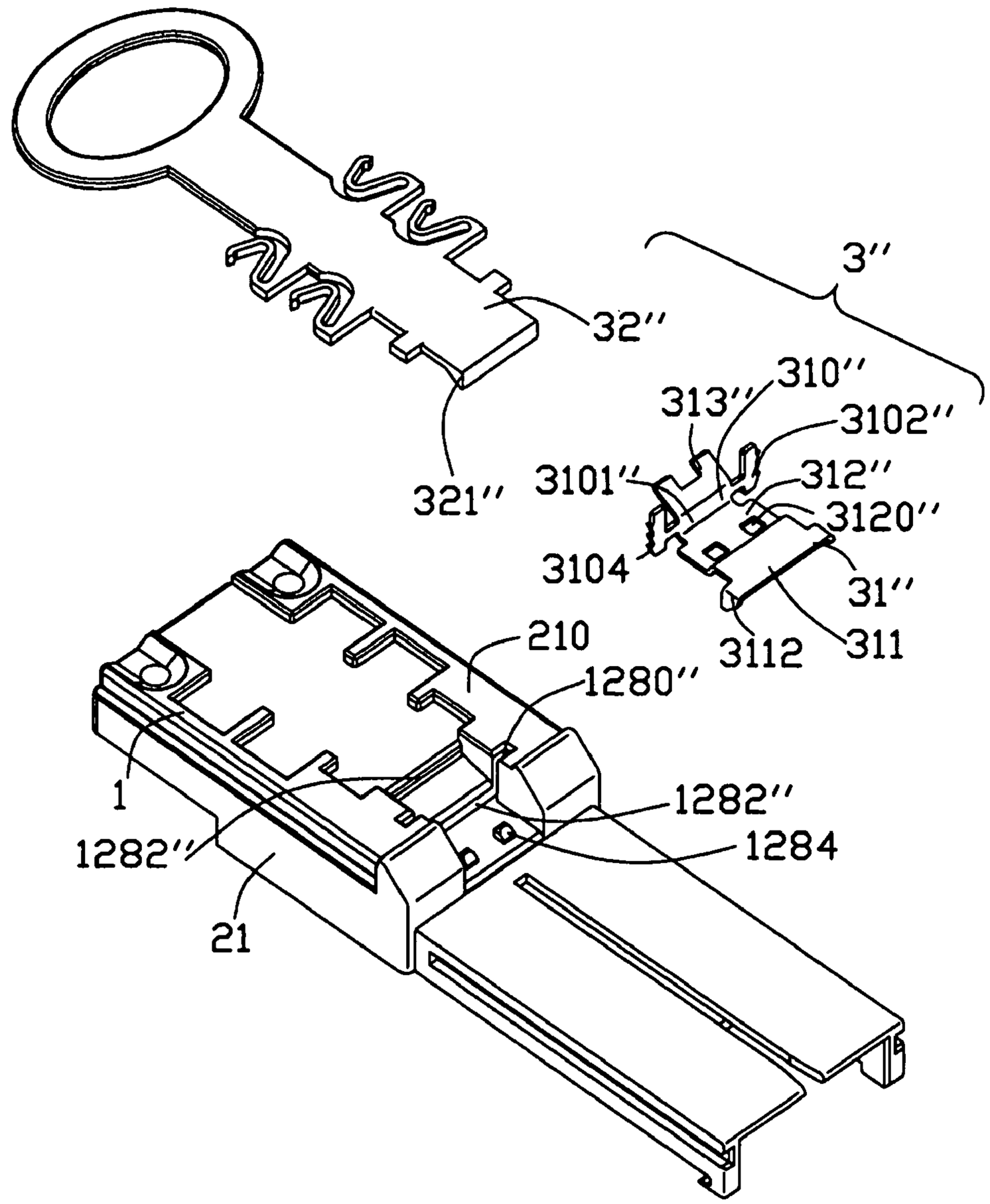


FIG. 18


3''
32''
321''
310''
313''
3102''
3101''
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311
3112
210
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1
1282''
1282''
1284
21

FIG. 19

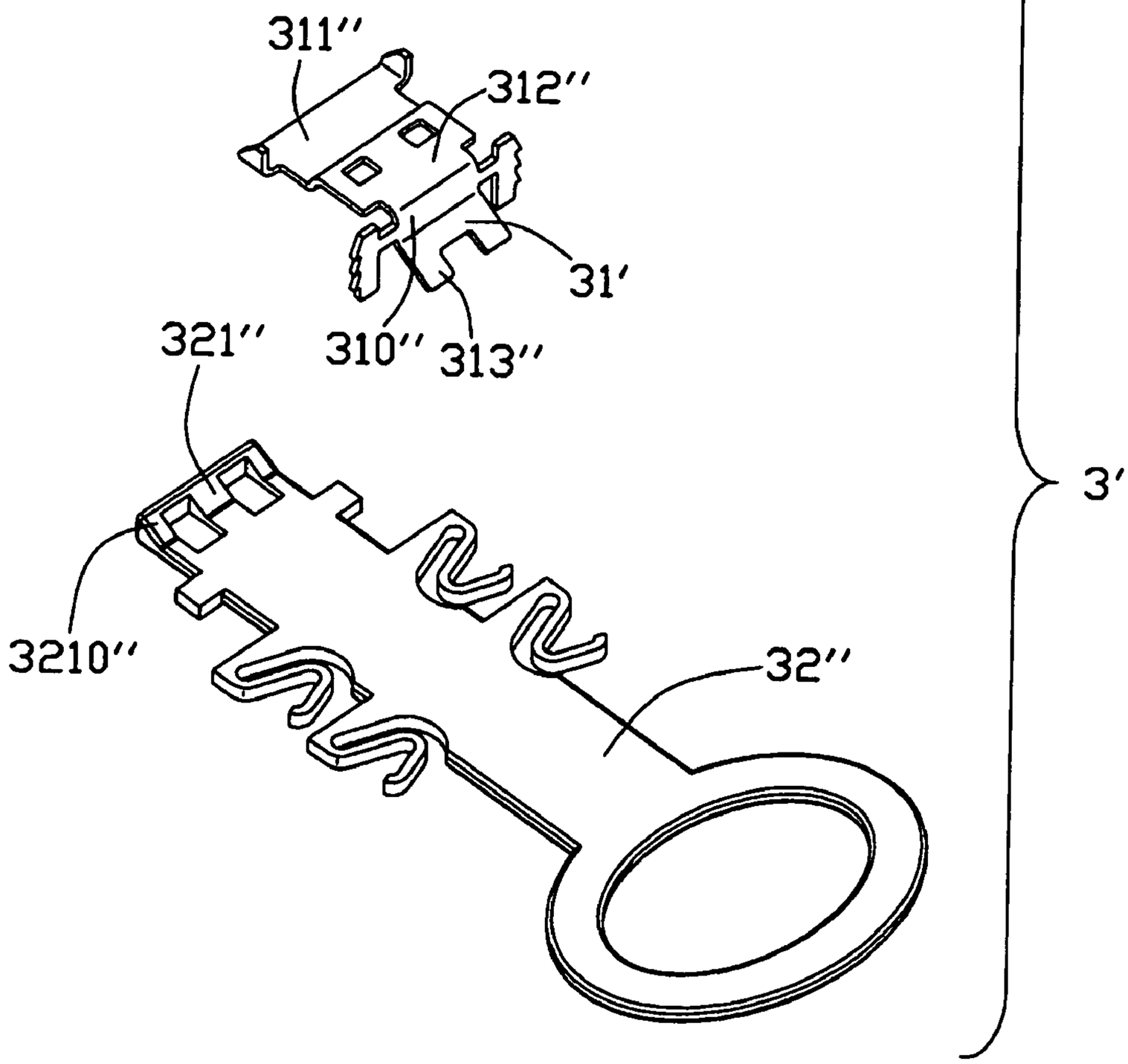

FIG. 20

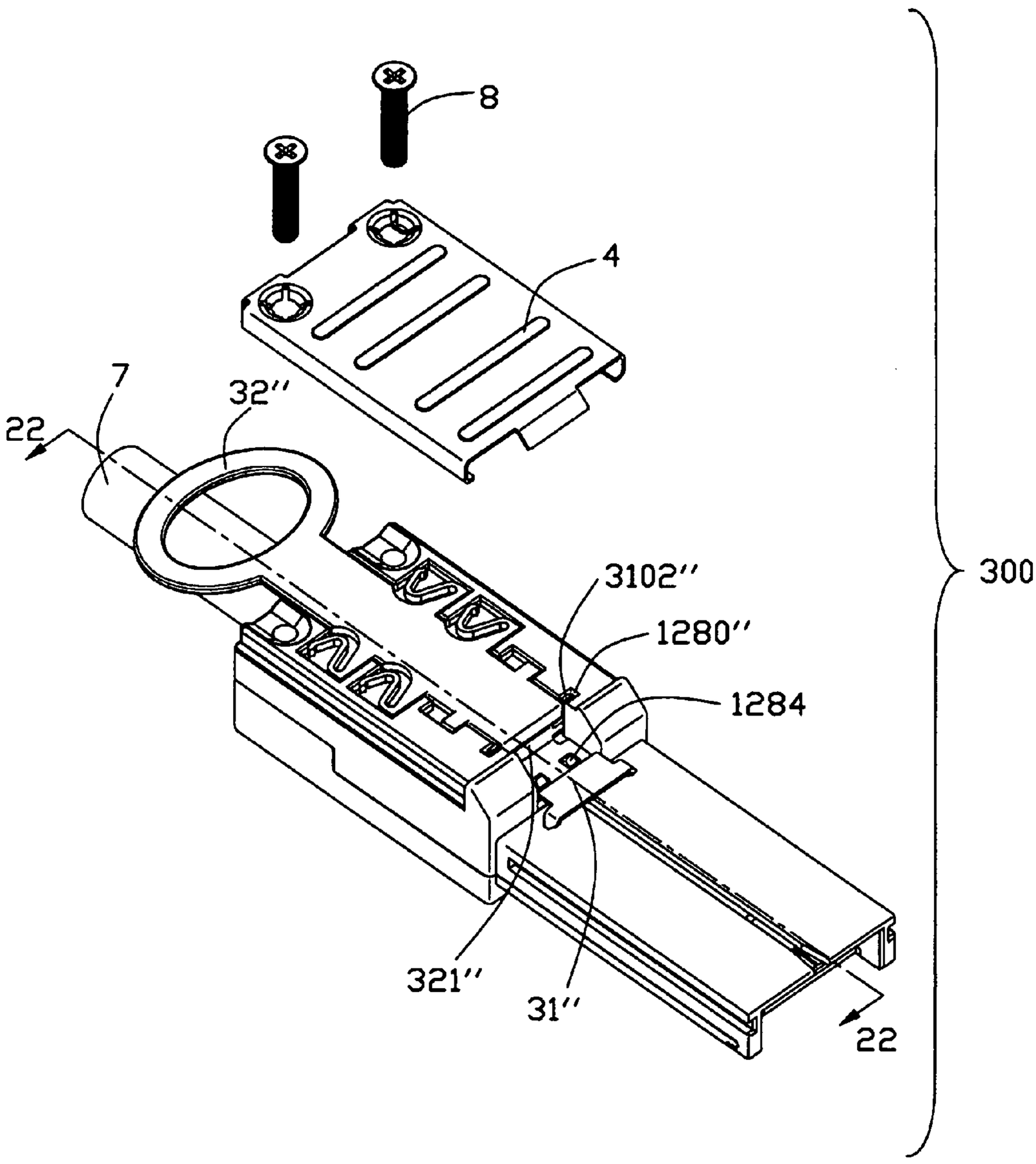

FIG. 21

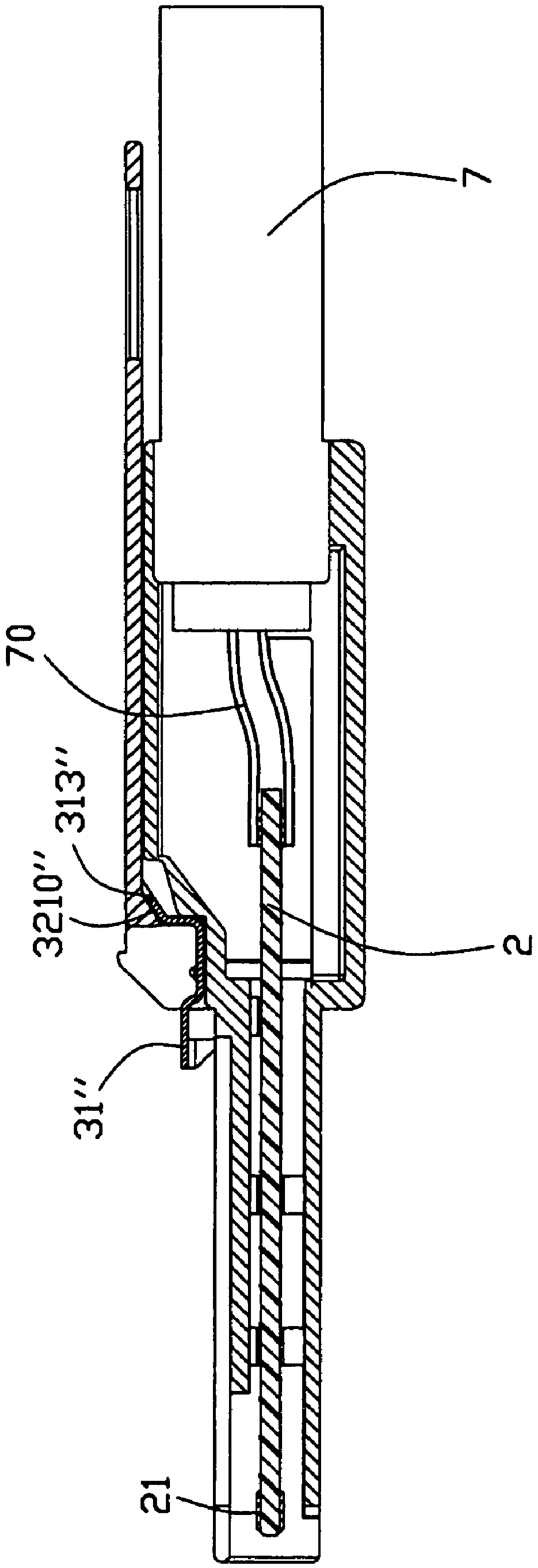

FIG. 22

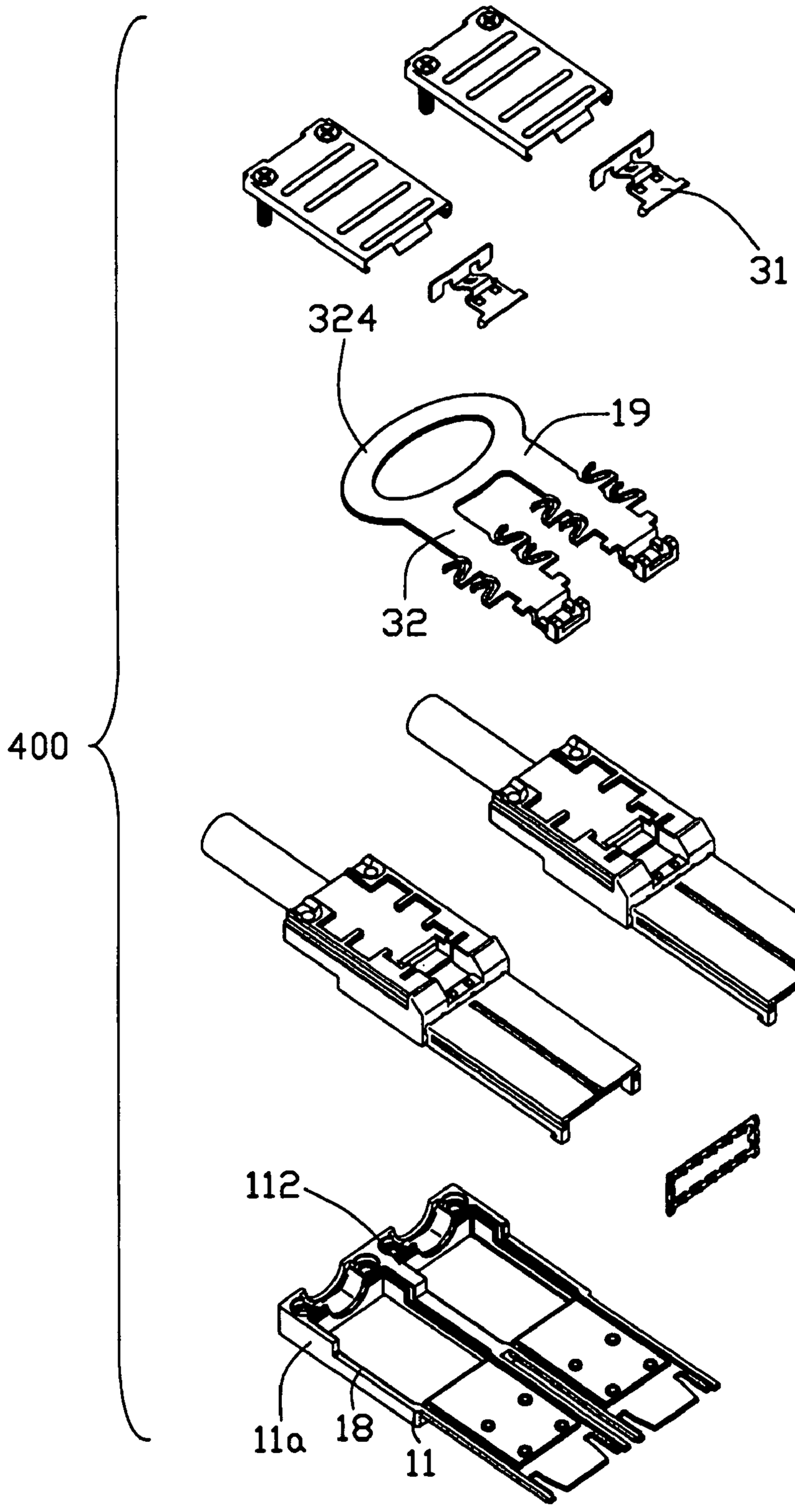

FIG. 23

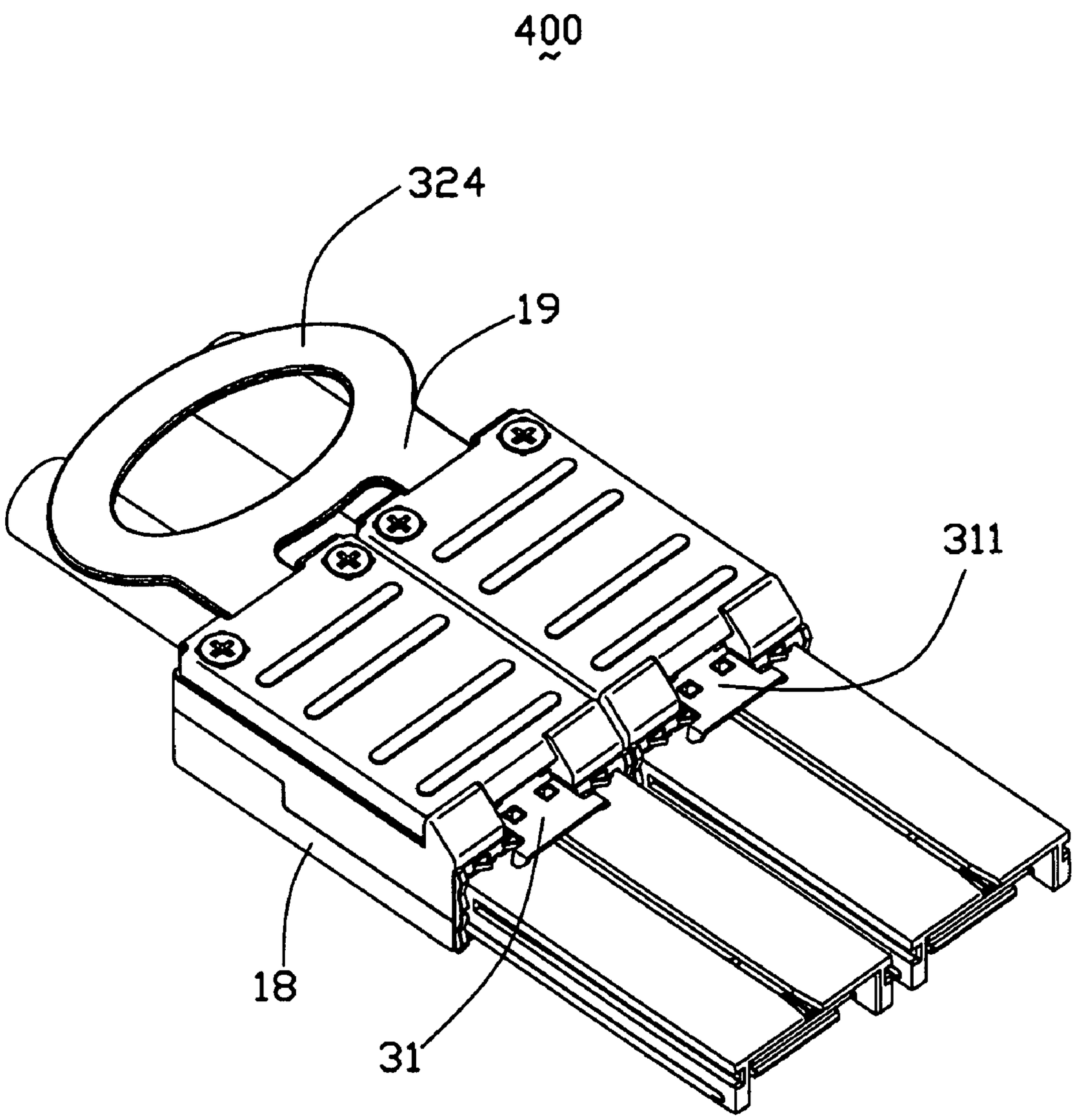

FIG. 24

CABLE CONNECTOR ASSEMBLY WITH LATCHING MECHANISM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention generally relates to a cable connector assembly, and more particularly to a cable connector assembly used for high-speed signal transmission.

2. Description of Related Art

A committee called SFF is an ad hoc group formed to address storage industry needs in a prompt manner. When formed in 1990, the original goals were limited to define de facto mechanical envelopes within disk drives can be developed to fit compact computer and other small products. Specification SFF-8088 defines matable Compact Multilane Shielded connectors adopted for being used in laptop portable computer to connect small-size disk drives to a printed circuit board. The connectors comprise a cable connector assembly connecting with the small-size drive and a header mounted on the printed circuit board. The cable connector assembly defined in the specification comprises a pair of engagble metal housings together defining a receiving space therebetween, a PCB received in the receiving space, a cable comprising a plurality of conductors electrically connecting with the PCB, and a latching mechanism assembled to a top surface of the upper metal housing. The latching mechanism comprises an elongated T-shape latch member for latching with the header mentioned above and a pulling member cooperating with the latch member for actuating the latch member to separate from the header. The latch member is assembled to a rear portion of a base of the upper housing with latch portion exposed beyond a front portion of the base of the upper housing to locate above a tongue portion of the upper housing. However, such elongated latch member is hard to be actuated by the pulling member, otherwise the latch member must have enough thickness or made by high-quality material having enough rigidity to achieve the goal of latching reliably and unlatching easily. In addition, the PCB also needs to be retained reliably in the metal housings.

Hence, an improved cable connector assembly is provided in the present invention to address the problems mentioned above and meet the current trend.

BRIEF SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to provide a cable connector assembly which can latch with a complementary connector reliably and unlatch from the complementary connector easily.

Another object of the present invention is to provide a cable connector assembly with a PCB retained therein reliably.

In order to achieve the above-mentioned object, a cable connector assembly in accordance with the present invention can mate with a complementary connector and comprises a metal housing defining a receiving space, a printed circuit board retained in the receiving space of the metal housing, a cable electrically connecting with the printed circuit board, and a latch member assembled to the metal housing. The metal housing forms first engaging means on inner surface thereof and exposed in the receiving space. The printed circuit board forms second engaging means cooperating with the first engaging means to retain the printed circuit board to the metal housing. The latch member comprises an engaging portion substantially vertically planted into the top surface of the housing and a latch portion extending forwardly from the engaging portion and beyond the front surface of the metal housing.

Other objects, advantages and novel features of the invention will become more apparent from the following detailed description of the present embodiment when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an exploded, perspective view of a cable connector assembly in accordance with the first embodiment of the present invention;

FIGS. **2–4** are views similar to FIG. **1**, but viewed from different angles;

FIG. **5** is an enlarged view of a gasket of the cable connector assembly of FIG. **1**;

FIG. **6** is a partially assembled view of the cable connector assembly of FIG. **1**;

FIG. **7** is a view similar to FIG. **6**, but viewed from a different angle;

FIG. **8** is an assembled view of the cable connector assembly of FIG. **1**;

FIG. **9** is a view similar to FIG. **8**, but viewed from a different angle;

FIGS. **10–14** are cross-section views taken along lines **10—10** to **14—14** of FIG. **8**;

FIG. **15** is partially exploded, perspective view of the cable connector assembly in accordance with the second embodiment of the present invention;

FIG. **16** an exploded view of a latch mechanism of the second embodiment;

FIG. **17** is a partially assembled view of the cable connector assembly of the second embodiment;

FIG. **18** is a cross-section view taken along line **18—18** of FIG. **17**;

FIG. **19** is a partially exploded, perspective view of the cable connector assembly in accordance with the third embodiment of the present invention;

FIG. **20** is an exploded view of a latch mechanism of the third embodiment;

FIG. **21** is a partially assembled view of the cable connector assembly in accordance with the third embodiment;

FIG. **22** is a cross-section view taken along line **22—22** of FIG. **21**;

FIG. **23** is an exploded, perspective view of a cable connector assembly in accordance with the forth embodiment of the present invention; and

FIG. **24** is an assembled view of the cable connector assembly of FIG. **23**.

DETAILED DESCRIPTION OF THE INVENTION

Reference will now be made to the drawing figures to describe the present invention in detail.

Referring to FIGS. **1–4**, a cable connector assembly **100** in accordance with the first embodiment of the present invention comprises a metal housing **1**, a printed circuit board (PCB) **2** located in the metal housing **1**, a cable **7** with a cable holder **6** electrically connecting with the PCB **2**, a latch mechanism **3** assembled to the metal housing **1**, a metal shell **4** assembled to the metal housing **1** to partially cover the latch mechanism **3**.

Please refer to FIGS. **1–8**, the metal housing **1** comprises a base **11**, a cover **12** engagble with the base **11** and a receiving space **15** formed between the base and the cover

11, 12. The metal housing 1 also comprises a rectangular base portion 13 and an elongated tongue portion 14 extending forwardly from the base portion 13.

The base 11 comprises a first base section 11*a* and a first tongue section 11*b* extending forwardly from the first base section 11*a*. The first base section 11*a* comprises a first flat portion 110, a pair of first flanges 112 and a first rear wall 113 extending upwardly from opposite side edges and rear edge of the first flat portion 110. The front portions of the first flanges 112 are cut to present the first flanges 112 L-shaped. A first substantially semicircular opening 1130 is defined in the first rear wall 113 and a pair of first screw holes 1132 are defined in the first rear wall 113 and located at opposite sides of the first semicircular opening 1130. A first slit 1120 extends downwardly from a top surface of the first base section 11*a* and into the first flanges 112 and a front portion of the first rear wall 113. The first tongue section 11*b* comprises a first panel 118 formed with a pair of ribs 114 located at opposite sides thereof. Each rib 114 forms a tip end 1140 extending beyond a front edge of the flat portion 118. The first panel 118 also forms two pairs of first standoffs 115 spaced arranged thereon, and each first standoff 115 defines a first positioning hole 1150 therein. A pair of U-shape cutouts 117 extend rearward from the front edge of the first panel 118 and respectively locate adjacent to corresponding ribs 1140.

The cover 12 comprises a second base section 12*a* and a second tongue section 12*b* extending forwardly from the second base section 12*a*. The second base section 12*a* comprises a second flat portion 120, a pair of second flanges 122 and a second rear wall 123 extending downwardly from opposite side edges and a rear edge of the second flat portion 120. The rear portions of the second flanges 122 and the second rear wall 123 are cut to present the second flanges 122 L-shaped. A second substantially semicircular opening 1230 is defined in the second rear wall 123. A pair of second screw holes 1232 are defined through the second rear wall 123 and locate at opposite sides of the second semicircular opening 1230. Corresponding to the first slit 1120 of the base 11, a continuous protruding ridge 1220 integrally extend downwardly from inner edges of the second flanges 122 and the second rear wall 123. The second flat portion 120 defines a first recess section 127 consisting of different-size first and second recesses 1270, 1272, and a deeper and narrower second recess section 128 formed in a front portion of the second flat portion 120 to communicate with a front surface of the second flat portion 120. A deeper slit 1280 is defined in the front portion of the second flat portion 120 and extends in a direction perpendicular to that of the second recess section 128 to communicate with the second recess section 128. A transversely-extending bar 1282 is formed at a front end of the second recess section 128 with a pair of projections 1284 arranged thereon. A pair of first channels 121 are respectively defined in opposite sides of the first flat portion 12*a* extending in a back-to-front direction. A pair of rims 129 are formed at the front portion of the first flat portion 12*a*.

The second tongue section 12*b* comprises a second panel 124 formed with a long keyway 1244 and a pair of side walls 125 extending downwardly from opposite sides of the second panel 124. A pair of second channels 1250 are defined in corresponding side walls 125 opened toward outside for guiding an insertion of a complementary connector (not shown). A pair of protrusions 126 extend rearward from a front surface of the second tongue section 12*b* and respectively locate below the side walls 125 to form a pair of gaps 1260 therebetween. The second panel 124 forms a enhancing portion (not labeled) on a bottom surface thereof for enhancing the strength thereof and three pairs of second standoffs 1240 are symmetrically arranged on the enhancing portion with two pairs of second standoffs 1240 formed with posts 1242 extending downwardly. The first and second standoffs 115, 1240 with the first and second positioning holes 1150, 1242 are served as first engaging means of the housing 1. The first engaging means is not limited to the structures described above, it also can be protrusions protruding from the first and second tongue sections 11*b*, 12*b*, or recesses recessed from the first and second tongue sections 11*b*, 12*b*.

The PCB 2 is formed with a plurality of first conductive pads 21 aligned at a front end thereof and a plurality of second conductive pads 22 aligned at an opposite rear end thereof with different amount from that of the first conductive pads 21. The first and second conductive pads 21, 22 electrically connect with one another through inner traces disposed in the PCB 2. Two pairs of holes 23 served as are symmetrically arranged on the PCB 2 adjacent to the first conductive pads 21. The holes 23 are served as second engaging means of the PCB 2. The second engaging means is also not limited to the structures described above, it can be standoffs with holes to receive the respective protrusions of the first engaging means of the housing 1, or different-shape projections formed on opposite surfaces of the PCB to be received in the recesses of the first engaging means of the housing 1.

The latch mechanism 3 comprises a latch member 31 latching with the complementary connector and a pulling member 32 cooperating with the latch member 31 to actuate the latch member 31 to unlatch from the complementary connector.

The latch member 31 is made of metal material and is a cantilever-type member. The latch member 31 comprises a N-shape engaging portion 310 located in a vertical surface, a flat latching portion 311 located in a horizontal surface perpendicular to the vertical surface and an inclined connecting portion 312 connecting the engaging portion 310 with the latching portion 311 to provide spring force to the latch member 31. The engaging portion 310 comprises a transverse bar section 3101 and a pair of side sections 3102 extending downwardly from opposite sides of the bar section 3101. Each side section 3102 is formed with barbs 3104 on outmost edge thereof. The flat latching portion 311 defines a pair of rectangular holes 3110 at a rear portion thereof adjacent to the connecting portion 312 and a pair of latches 3112 bending downwardly from opposite sides of the front edge thereof. The connecting portion 312 connects with middle portion of the bar section 3101 and extends upwardly from a lower edge of the bar section 3101. The connecting portion 312 also defines a hole therein for adjusting spring force of the latch member 31 through changing size and shape of the hole.

The pulling member 32 is made by insulative material and comprises a cooperating portion 321, an elongated intermediate portion 323 extending rearward form the cooperating portion 321 and formed with interference portion 322, and a ring-shape operating portion 324 formed at a rear end of the intermediate portion 323. The interference portion 322 comprises a pair of stop sections 3212 formed at opposite sides of the intermediate portion 323 and located adjacent to the cooperating portion 321 and two pairs of elastic sections 3220 formed at middle portion of the intermediate portion 323. Each elastic sections 3220 comprises a transverse block section 3224 and a V-shape claw section 3226 extending rearward from the block section 3224. The cooperating

portion **321** comprises a vertical section **3210** connecting the cooperating portion **321** with the intermediate portion **323** and a body section **3212** extending forwardly from a lower edge of the vertical section **3210**. The body section **3212** forms a pair of upwardly extending ribs **3214** with tip end formed with enlarged protrusions **3216**. A slanted surface **3218** downwardly and rearward extends from a front surface of the body section **3212**.

The conductive shell **4** comprises a body portion **40** formed with a plurality of bars **400** on a top surface for increasing friction and a pair of L-shape lateral walls **42** extending downwardly from opposite sides of the body portion **40**. A pair of holes **402** and a downwardly-extending first tab **404** are respectively formed in a rear portion and a front edge of the body portion **40**. A pair of second tabs **405** are formed with the body portion **40** extending downwardly from a rear edge of the body portion **40**.

In assembly, conductors **70** of the cable **7** are respectively soldered to the second conductive pads **22** of the PCB **2**. The PCB **2** with the cable **7** is located on the first standoffs **115** of the base **11** with the holes **23** aligned with the first positioning holes **1150** and the cable **7** is located in the first semicircular opening **1130** of the base **11**. The cable connector assembly **100** of the present invention may have a cable holder **6** grasping a metal braiding area exposed outside of the cable **7** to provide strain relief to the cable **7**. The cover **12** is assembled to the base **11** and the PCB **2** with the posts **1242** protruding through the holes **23** and the first positioning holes **1150** to position the PCB **2** in the receiving space **15** of the housing **1**. The PCB **2** is sandwiched between the base **1** and the cover **12** by the first and second engaging means engaging with each other. The protruding ridge **1220** of the cover **12** is received in the first slit **1120** of the base **11** and the pair of tip ends **1140** received in the gaps **1260**, thus, the base **11** and the cover **12** are also securely assembled together. The first and second screw holes **1132**, **1232** combine into a screw receiving space **17** (FIG. **13**).

Referring to FIG. **6** in conjunction with FIGS. **11–14**, the latch mechanism **3** is assembled to the second base section **12***a* of the cover **12** along a vertical direction perpendicular to the front-to-back direction. The pulling member **32** is firstly pressed to the cover **12**. The cooperating portion **321** of the pulling member **32** is received in the second recess section **128** of the cover **12**, and the intermediate portion **323** with the interference portion **322** are received in the first recess section **127**. The stop sections **3222** and the elastic sections **3220** are respectively sliderably received in the different-size first and second recesses **1270**, **1272** with the block section **3224** and claw section **3226** respectively abutting against opposite edges of the large-size second recesses **1272**. The latch member **31** is assembled to the cover **12** along the vertical direction and the engaging portion **310** is interferentially received in the slit **1280**. The inclined connecting portion **312** is located on the slanted surface **3218** of the body section **3212** of the cooperating portion **321**. The bar section **3101** of the latch member **31** are located on the ribs **3214** with the enlarged protrusions **3216** located in front of the bar section **3101**. The projections **1284** of the cover **12** are respectively received in the rectangular holes **3110** and the latches **3112** exposed above the second tongue section **12***b*.

When the complementary connector mates with the cable connector assembly **100** of the present invention, contacts of the complementary connector may electrically connect with the first conductive pads **21** of the PCB **2** with corresponding structure thereof latches with the latches **3112** of the latch member **31**. When the cable connector assembly **100** disengages from the complementary connector, a rearward pulling force exerts to the operating portion **324** of the pulling member **32** to actuate the pulling member **32** rearward move with the elastic sections **3220** and the stop sections **3222** sliding in the second and first recesses **1272**, **1270** until the enlarged protrusions **3216** abut against the bar section **3101** of the latch member **31**. The body section **3212** also rearward moves with the slanted surface **3218** sliding along a bottom periphery of the inclined connecting portion **312**, thus actuating the connecting portion **312** to pivot upwardly relative to the bar section **3101** of the engaging portion **310** and the latch section **311** with the latches **3112** to upwardly move to unlatch from the complementary connector. After the rearward pulling force is removed, restore force of the elastic sections **3220** actuates the pulling member **32** to move forwardly to its original position, and thus, the latch member **31** also reverts to its original position.

The conductive shell **4** is finally assembled to the second base section **12***a* of the cover **12** with the L-shape lateral walls **42** sliderably received in the first channels **121** of the cover **12** along a back-to-front direction until a front edge of the conductive shell abuts against the rims **129**. The first tab **404** is received in the second recess section **128** of the cover **12** and the second tabs **405** respectively locate on steps formed on rear edge of the cover **12**. The first tab **404** also presses on the latch member **31** to provide extra return force to the latch member **31** when disengaging the cable connector assembly **100** from the complementary connector. A pair of screws **8** are screwed through the holes **402** of the shell **4**, the second screw holes **1232** of the cover **12** and the first screw holes **1132** of the base **11** to retain the shell **4** with the base **11** and the cover **12**.

The metal housing **1** may define a plurality of splits **16** spaced arranged on the tongue portion **14** adjacent to the front surface of the base portion **13**. The cable connector assembly **100** of the present invention may have a gasket **5** assembled to the metal housing **1** for reducing the Electro Magnetic Interference (EMI) in the signal transmission. The gasket **5** is a rectangular frame and stamped from a metal sheet. The gasket **5** comprises a continuous periphery wall **50** consisting of a pair of opposite longitudinal edges **501** and a pair of side edges **502** respectively connecting with the longitudinal edges **501**. The gasket **5** also defines a space **51** circumscribed by the periphery wall **50**. A plurality of tubers **52** are spaced arranged on inner edge of the periphery wall **50** and all extend toward the space **51**. A plurality of first spring fingers **503** are stamped corresponding to the tubers **52** formed on the longitudinal edges **501**. Each side edge **502** is formed with a pair of second spring fingers **504** respectively extending toward each other from opposite upper and lower edges thereof. The tubers **52** are respectively received in the splits **16** of the housing **1** for retaining the gasket **5** in the housing **1**. The first and second spring fingers **503**, **504** may elastically engage with a conductive panel to which the complementary connector is mounted for grounding and reducing EMI.

A cable assembly **200** of the second embodiment of the present invention is illustrated in FIGS. **15–18**. The difference between the cable assemblies **100**, **200** exists in the latch mechanisms **3**, **3'**. Thus, the description of the same members is omitted here and some same members are omitted in the drawing figures.

Referring to FIGS. **15–16**, the latch mechanism **3'** of the cable assembly **200** has the substantially same structure as that of the latch mechanism **3** of the cable assembly **100**. The latch mechanism **3'** also comprises a latch member **31'** and

a pulling member **32'** cooperating with the latch member **31'**. The latch member **31'** comprises a U-shape engaging portion **310'** located in a vertical surface, the flat latching portion **311** located in a horizontal surface perpendicular to the vertical surface and the inclined connecting portion **312** connecting the engaging portion **310'** with the latching portion **311**. The latching portion **311** and the connecting portion **312** have the same structures as those of the latch member **31**. Compared with the engaging portion **310**, the engaging portion **310'** comprises a transverse bar section **3101'** and a pair of side sections **3102'** extending upwardly from opposite sides of the bar section **3101'**. The connecting portion **312** extends upwardly from an upper edge of the middle portion of the bar section **3101'**.

The pulling member **32'** also has the substantially same structure as that of the pulling member **32** except the cooperating portion **321'**. The cooperating portion **321'** of the second embodiment extends flatly from the intermediate portion **323** and forms a pair of downwardly-extending protruding sections **3210'** at tip end thereof. The cooperating portion **321'** is partially cut to form a pair of slanted surfaces **3218'** on the protruding sections **3210'** and a receiving area **3214'** to receive a corresponding portion of the latch member **31'**.

Corresponding to the structure changes of the latch member **31'**, the second base section **12***a* of the cover **12** forms a pair of vertical slits **1280'** perpendicular to the second recess section **128** and forms a step **1282'** corresponding to the position of the slits **1280'**.

In assembly (the assembly of other same members are omitted here), referring to FIGS. **17–18**, the latch member **31'** is planted to the housing **1** in the vertical direction and received in the second recess section **128**. The pair of side sections **3102'** of the engaging portion **310** are respectively interferentially received in the slits **1280'** by the barbs **3104** formed thereon and the bar section **3101'** abut against the front surface of the step **1282'**. The projections **1284** of the cover **12** are received in corresponding rectangular holes **3110** with the latch section **311** exposed above the second tongue section **12***b*. The pulling member **32'** is assembled to the housing **1** and the latch member **31'** first in a front-to-back direction to let the cooperating portion **321'** locate below the connecting portion **312** of the latch member **31'** and in the second recess section **128**, then in the vertical direction to press other portions of the pulling member **4** to be received in the first recess section **127** of the housing **1** (same as in the first embodiment, omitted here). The connecting portion **312** is received in the receiving area **3214'** of the pulling member **32'**. As to disengage the cable assembly **200** from the complementary connector, a rearward pulling force is exerted to the pulling portion **324** of the pulling member **32'**. The slanted surfaces **3218'** of the cooperating portion **321'** slide along the inclined connecting portion **312** of the latch member **31'** until the protruding sections **3210'** abuts against the bar section **3101'** of the latch member **31'** to actuate the connecting portion **312** to pivot upwardly relative to the bar section **3101'** of the engaging portion **310'** and the latch section **311** with the latches **3112** to upwardly move to disengage from the complementary connector. The pair of vertical walls forming the second recess section **128** prevents the pair of protruding sections **3210'** of the cooperating portion **321'** from moving outwardly when the pulling member **32'** is pulled rearward.

Referring to FIGS. **19–22**, a cable connector assembly **300** in accordance with the third embodiment of the present invention is illustrated. The latch mechanism **3"** of the cable connector assembly **300** also comprises a latch member **31"** and a pulling member **32"** cooperating with the latch member **31"**. Same members and structure description are omitted in the specification and in the drawing figures.

Referring to FIGS. **19–20**, tip end of the cooperating portion **321"** of the pulling member **32"** is enlarged and forms an inclined surface **3210"** for latching with the latch member **31"**.

The latch member **31"** comprises a flat connecting portion **312"** formed with a pair of rectangular holes **3120"**, a latch section **311"** upwardly then flatly extending from a front edge of the connecting portion **312"**, an H-shape engaging portion **310"** vertically extending from a rear edge of the connecting portion **312"**, and an inclined portion **313'** upwardly and rearward extending from a middle of the engaging portion **310"**. The engaging portion **310"** comprises a pair of vertically-extending side sections **3102"** and a transversely-extending bar section **3101"** connecting with lower portions of the side sections **3102"**.

In assembly, the latch member **31"** is assembled to the housing **1"**, which has the same structure as the housing **1'** of the second embodiment, in the vertical direction and received in the second recess section **128**. The side sections **3102"** are interferentially received in the slits **1280"** via the barbs **3104** formed thereon and the bar section **3101"** abuts against the step **1282"** in the second recess section **128**. The projections **1284** of the housing **1"** are received in the rectangular holes **3120"** of the connecting portion **312"** and the latch portion **311** with the latches **3112** exposed above the second tongue section **12***b*. The pulling member **32"** is assembled to the housing **1"** and the latch member **31"** in the vertical direction. The inclined surface **3210"** of the cooperating portion **321"** presses on the slanted portion **313"** with other portions of the pulling member **32"** received in the first recess section **127** as described in the first embodiment.

When to disengage the cable connector assembly **300** from the complementary connector, a rearward pulling force is exerted to the pulling portion **324** of the pulling member **32"**, the inclined surface **3210"** of the cooperating portion **321"** rearward moves and slides along the slanted surface of the slanted portion **313"** of the latch member **31"**. With the pivotal downward movement of the slanted portion **313"** relative to the bar section **3101"** of the engaging portion **310"**, the latch portion **311** moves pivotally upwardly relative to the bar section **3101"** to disengage from the complementary connector.

FIGS. **23–25** shows the forth embodiment of the present invention. The assembly **400** of the forth embodiment comprises a pair of cable connector assemblies juxtaposed arranged, each cable connector assembly has the same structure as that of the cable connector assembly **100** of the first embodiment. Of course, the cable connector assemblies **200**, **300** also can be juxtaposed arranged. The assembly **400** integrates a pair of bases **11** into a base portion **18** and integrates a pair of pulling members **32** into a pulling part **19**. The first flanges **112** of the pair of bases **11** are integrated together and the pair of pulling members **32** uses a common operating portion **324** which integrates the pair of pulling members **22** together. The assembly process is same as that of the cable assembly **100** of the first embodiment and is omitted here. To disengage the assembly **400** from the complementary connector, a rearward pulling force is exerted to the common operating portion **324** to actuate upward movement of the pair of latch sections **311** of the latch members **31**, thus, the assembly **400** disengages from the complementary connector.

It is to be understood, however, that even though numerous characteristics and advantages of the present invention

have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

What is claimed is:

1. A cable connector assembly adapted for mating with a complementary connector along a font-to-back direction, comprising:

a metallic housing defining a receiving space and a top surface;

a printed circuit board retained in the receiving space of the metal housing;

a cable electrically connecting with the printed circuit board;

a latch member assembled to the top surface of the metal housing, the latch member comprising an engaging portion engaging with the housing and a latch portion extending forwardly from the engaging portion for be deflected in a vertical direction perpendicular to said front-to-back direction, so as to latch or unlatch with regard to the complementary connector;

a pulling member assembled to the metallic housing to actuate said latch member, and

a shell located upon the metallic housing and essentially vertically shielding the pulling member with a rear pulling portion of the pulling member exposed to an exterior.

2. A cable connector assembly adapted for mating with a complementary connector along a mating direction, comprising:

a metal housing defining a top surface and a front surface perpendicular to the top surface;

a printed circuit board retained in a receiving space of the metal housing;

a cable electrically connecting with the printed circuit board;

a latch member assembled to the top surface of the metal housing for latching with the complementary connector, the latch member comprising an engaging portion engaging with the housing and a latch portion extending forwardly from the engaging portion and beyond the front surface of the metal housing; and

a conductive shell assembled to the top surface of the metal housing and exerting a restore force to the latch member as the latch member deflected in a vertical direction perpendicular to said mating direction for unlatching from the complementary connector.

3. The cable connector assembly as claimed in claim **2**, wherein the latch member comprises a connecting portion connecting the engaging portion and the latch portion, and wherein the conductive shell comprises a downwardly-extending portion locating above the connecting portion and exerting said downward restore force to the connecting portion when the latch member deflected.

4. The cable connector assembly as claimed in claim **2**, wherein the conductive shell is assembled to the metal housing along said mating direction.

5. The cable connector assembly as claimed in claim **2**, wherein the engaging portion is located in a first surface which is perpendicular to the top surface of the housing, and the latch portion is located in a second surface which is parallel to the top surface of the housing.

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